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抗凝血酶的術後活性而並非是術前活性與冠脈搭橋手術後嚴重心臟意外有關

Postoperative Activity, but Not Preoperative Activity, of Antithrombin Is Associated with Major Adverse Cardiac Events After Coronary Artery Bypass Graft Surgery

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背景：低水準的抗凝血酶（AT）是心臟手術後重症監護時間延長和神經系統與血栓栓子不良事件發生增加的獨立危險因素。我們假設圍手術期 AT 活性與冠脈搭橋（CABG）手術患者術後嚴重心臟意外事件（MACEs）獨立相關。
方法：我們前瞻性研究了 1403 例在體外迴圈（CPB）下初次行 CABG 手術的患者。主要的臨床觀察終點是 MACE 的發生率，MACE 定義爲，有一種或多種以下情況的一個混合結局：術後死亡、冠脈搭橋梗阻再次手術、心肌梗塞、中風、肺栓塞或心臟停搏一直到第一次出院。在術前、CPB 魚精拮抗後和術後（PODs）1－5 天檢測血漿 AT 活性。用多元邏輯回歸模型來評估圍手術期 AT 活性對 MACE 的獨立效應。
結果：有 146 例（10.4%）患者發生了 MACE，包括術後死亡（n＝12）、心肌梗塞（n＝108）、中風（n＝17）、肺栓塞（n＝8）、心臟停跳（n＝16）或隨後的術後或導管治療的冠脈梗阻（n＝6）。AT 活性的基礎水準在有 MACE(0.91 ± 0.13 IU/mL; n = 146)和沒有 MACE(0.92 ± 0.13 IU/mL; n = 1257)之間無差異(P = 0.18)。兩組的 AT 活性在 CPB 後顯著下降，在接著的 5 PODs 中恢復到基礎水準。有 MACE 的患者的術後 AT 活性顯著低於無 MACE 的患者。調整 MACE 的臨床預測因數之後，發現 PODs 2 和 3 的 AT 活性與 MACE 有關係。
結論：術前 AT 活性和 CABG 術後的 MACE 發生沒有關係。MACE 的發生與術後 AT 活性獨立相關，但僅僅主要是發生在 MACE 出現之後的時點。
（唐亮 譯 馬皓琳 李士通 校）

BACKGROUND: Low levels of antithrombin (AT) have been independently associated with prolonged intensive care unit stay and an increased incidence of neurologic and thromboembolic events after cardiac surgery. We hypothesized that perioperative AT activity is independently associated with postoperative major adverse cardiac events (MACEs) in patients undergoing coronary artery bypass graft (CABG) surgery.

METHODS: We prospectively studied 1403 patients undergoing primary CABG surgery with cardiopulmonary bypass (CPB). The primary clinical end point was occurrence of MACE, defined as a composite outcome of any one or more of the following: postoperative death, reoperation for coronary graft occlusion, myocardial infarction, stroke, pulmonary embolism, or cardiac arrest until first hospital discharge. Plasma AT activity was measured before surgery, after post-CPB protamine, and on postoperative days (PODs) 1-5. Multivariate logistic regression modeling was performed to estimate the independent effect of perioperative AT activity upon MACE.
RESULTS: MACE occurred in 146 patients (10.4%), consisting of postoperative mortality (n = 12), myocardial infarction (n = 108), stroke (n = 17), pulmonary embolism (n = 8), cardiac arrest (n = 16), or a subsequent postoperative or catheter-based treatment for graft occlusion (n = 6). AT activity at baseline did not differ between patients with (0.91 ± 0.13 IU/mL; n = 146) and without (0.92 ± 0.13 IU/mL; n = 1257) (P = 0.18) MACE. AT activity in both groups was markedly reduced immediately after CPB and recovered to baseline values over the ensuing 5 PODs. Postoperative AT activity was significantly lower in patients with MACE than those without MACE. After adjustment for clinical predictors of MACE, AT activity on PODs 2 and 3 was associated with MACE.
CONCLUSIONS: Preoperative AT activity is not associated with MACE after CABG surgery. MACE is independently associated with postoperative AT activity but only at time points occurring predominantly after the MACE.

在氣管導管套囊或口腔黏膜上予以鹽酸苄達明噴霧治療術後咽喉痛的效果

The Effectiveness of Benzydamine Hydrochloride Spraying on the Endotracheal Tube Cuff or Oral Mucosa for Postoperative Sore Throat

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Anesth Analg 2010; 111(4):887-89

背景：一般認爲喉鏡檢查、插管損傷或膨脹的氣管導管套囊對於氣道粘膜的擠壓是術後咽喉痛（POST）的病因。在本次研究中，我們比較了鹽酸苄達明（BH）用不同的方法噴霧在氣管導管（ET）套囊、口咽腔或以上兩處對於減輕 POST 的效果。
方法：在本次前瞻性雙盲研究中，我們招募了 380 名病人，他們被隨機分成以下 4 組：A 組爲在口咽腔內噴 BH，在 ET 套囊上噴蒸餾水；B 組爲在口咽腔內及 ET 套囊上均噴 BH；C 組爲在 ET 套囊上噴 BH，在口咽腔內噴蒸餾水；D 組爲在口咽腔內及 ET 套囊上均噴蒸餾水。我們檢測病人們在拔管後 0、2、4 和 24 小時咽喉痛的程度（無、輕、中、重）。
結果：A、B、C 和 D 組 POST 的發生率分別爲 23.2%、13.8%、14.7%和 40.4%。B 組和 C 組 POST 的發生率明顯低於 D 組（OR=0.36；95%CI 爲 0.21-0.60；P <

0.05）。然而，A 組和 D 組 POST 的發生率無顯著差異（OR=0.62；95%CI 爲 0.38-1.01）。此外，對於 POST 的發生率在口咽腔內和 ET 套囊上噴 BH 之間無顯著的相互作用(P = 0.088)。與 B 組和 C 組相比，D 組 POST 顯著較重(P < 0.001)。與 D 組相比，B 組的局部麻木感、燒灼感、伴或不伴有針刺感的發生率顯著較高(P < 0.05)。

結論：本研究表明在氣管導管套囊上予以 BH 噴霧可降低 POST 的發生率及減輕 POST 的嚴重性，並且不增加 BH 相關的副作用。

（毛祖旻 譯 馬皓琳 李士通 校）

BACKGROUND: The etiology of postoperative sore throat (POST) is considered to be the result of laryngoscopy, intubation damage, or inflated cuff compression of the tracheal mucosa. In this study, we compared the effectiveness in alleviating POST using different approaches to benzydamine hydrochloride (BH) administration by spraying the endotracheal tube (ET) cuff or the oropharyngeal cavity, or both.

METHODS: Three hundred eighty patients were included in this prospective and double-blind study, which was randomized into 4 groups: group A, oropharyngeal cavity spray of BH, and distilled water on the ET cuff; group B, both the oropharyngeal cavity and the ET cuff received BH spray; group C, the ET cuff received BH spray, and the oropharyngeal cavity received distilled water; and group D, distilled water sprayed on both the ET tube and into the oropharyngeal cavity. The patients were examined for sore throat (none, mild, moderate, severe) at 0, 2, 4, and 24 hours postextubation.

RESULTS: The incidence of POST was 23.2%, 13.8%, 14.7%, and 40.4% in groups A, B, C, and D, respectively. POST occurred significantly less frequently in groups B and C compared with group D (odds ratio: 0.36; 95% confidence interval: 0.21-0.60; P < 0.05). However, there was no significant difference between groups A and D (odds ratio: 0.62; 95% confidence interval: 0.38-1.01). Moreover, there was no significant interaction between spraying BH over the oropharyngeal cavity and the ET cuff on the incidence of POST (P = 0.088). The severity of POST was significantly more intense in group D compared with groups B and C (P < 0.001). Group B had a significantly higher incidence of local numbness, burning, and/or stinging sensation compared with patients in group D (P < 0.05).

CONCLUSIONS: This study indicates that spraying BH on the ET cuff decreases the incidence and severity of POST without increased BH-related adverse effects.

選擇性 5-HT1A 受體激動劑瑞匹諾坦拮抗嗎啡誘導的麻醉大鼠呼吸抑制

Repinotan, a Selective 5-HT1A-R-Agonist, Antagonizes Morphine-Induced Ventilatory Depression in Anesthetized Rats

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背景：機械通氣期間的自主呼吸能改善動脈氧合和心血管功能，但是危重病醫療過程中自主呼吸常常被阿片類藥物抑制。研究顯示，阿片類藥物誘導的麻醉大鼠呼吸抑制可以被血清素(1A)受體(5-HT1A-R)激動劑 8-OH-DPAT 所緩解，可是 8-OH-DPAT 不能用於人類。鹽酸瑞匹諾坦（Repinotan）是一種選擇性 5-HT1A 受體激動劑且已經用於人類研究，但是其對通氣和傷害性感受的作用還不甚瞭解。本研究中，我們試圖確定(a)瑞匹諾坦對自主呼吸和傷害性感受的效應以及(b)與標準阿片劑嗎啡之間的相互作用。
方法：在保留自主呼吸的麻醉大鼠中，同時監測單獨或聯合嗎啡的瑞匹諾坦對自主每分鐘通氣量(MV)和傷害感受性甩尾反射潛伏期(TFLs)的劑量依賴性效應。另外一組採用 0.9% NaCl 和 5-HT1A 受體拮抗劑 WAY 100 135 作爲對照。
結果：(a)瑞匹諾坦劑量依賴性促進自主呼吸(MV, 均數[95%可信區間]; 預處理水準的 53% [29%-77%])，較大劑量瑞匹諾坦(2-200 μg/kg)抑制感受性傷害(TLF,最大可能效應的 91% [68%-114%])。相反，小劑量瑞匹諾坦增強傷害性感受(0.2 μg/kg; TFL,最大可能效應的?47% [?95% to 2%])。5-HT1A 受體拮抗劑 WAY 100 135 可以預防這些效應。(b)嗎啡誘導的呼吸抑制(MV, ?72% [?100% to ?44%])被瑞匹諾坦(20 μg/kg)所逆轉，使得自主通氣恢復到預處理水準(MV, 18% [?40% to 77%])。嗎啡誘導的傷害性感受的完全抑制持續存在於給予瑞匹諾坦和 0.9%NaCl 的整個過程。儘管平均動脈壓輕微下降，沒有出現由瑞匹諾坦引起的嚴重心血管副反應。
結論：即使在嗎啡誘導呼吸抑制時，5-HT1A 受體激動劑瑞匹諾坦也能促進麻醉大鼠自主呼吸。5-HT1A 受體激動劑刺激自主呼吸和抗傷害性感受的能力有待進一步研究。
(江繼宏 譯 馬皓琳 李士通 校)
BACKGROUND: Spontaneous breathing during mechanical ventilation improves arterial oxygenation and cardiovascular function, but is depressed by opioids during critical care. Opioid-induced ventilatory depression was shown to be counteracted in anesthetized rats by serotonin(1A)-receptor (5-HT1A-R)-agonist 8-OH-DPAT, which cannot be applied to humans. Repinotan hydrochloride is a selective 5-HT1A-R-agonist already investigated in humans, but the effects on ventilation and nociception are unknown. In this study, we sought to establish (a) the effects of repinotan on spontaneous breathing and nociception, and (b) the interaction with the standard opiate morphine.
METHODS: The dose-dependent effects of repinotan, given alone or in combination with morphine, on spontaneous minute ventilation (MV) and nociceptive tail-flick reflex latencies (TFLs) were measured simultaneously in spontaneously breathing anesthetized rats. An additional series with NaCl 0.9% and the 5-HT1A-R-antagonist WAY 100 135 served as controls.
RESULTS: (a) Repinotan dose-dependently activated spontaneous breathing (MV, mean [95% confidence interval]; 53% [29%-77%]) of pretreatment level) and suppressed nociception (TLF, 91% maximum possible effect [68%-114%]) with higher doses of repinotan (2-200 μg/kg). On the contrary, nociception was enhanced with a small dose of repinotan (0.2 μg/kg; TFL, ?47% maximum possible effect [?95% to 2%]). Effects were prevented by 5-HT1A-antagonist WAY 100 135. (b) Morphine-induced depression of ventilation (MV, ?72% [?100% to ?44%]) was reversed by repinotan (20 μg/kg), which returned spontaneous ventilation to pretreatment levels (MV, 18% [?40% to 77%]). The morphine-induced complete depression of nociception was sustained throughout

repinotan and NaCl 0.9% administration. Despite a mild decrease in mean arterial blood pressure, there were no serious cardiovascular side effects from repinotan.
CONCLUSIONS: The 5-HT1A-R-agonist repinotan activates spontaneous breathing in anesthetized rats even in morphine-induced ventilatory depression. The potency of 5-HT1A-R-agonists to stimulate spontaneous breathing and their antinociceptive effects should be researched further.

經氣管氧合時的氧氣輸送：兩種手動設備的一項比較

Oxygen Delivery During Transtracheal Oxygenation: A Comparison of Two Manual Devices

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背景：經氣管供氧時，Manujet?和 ENK Oxygen Flow Modulator? (ENK)這兩種設備可供氧。我們試圖描述這兩種設備的通氣特點。
方法：本研究是在一個人工模肺中進行的，包括一條模擬氣管的 15cm 環形管，連接一個流量分析儀和一個人工肺。將一根 15 號鋼絲圈加強氣管導管用於經氣管氧合。在呼吸頻率爲 0、4 和 12 次/分時，分別研究 ENK 和 Manujet 3 分鐘，使用或不使用人工肺，在完全或部分閉塞氣道。資料分析採用基於 Fisher 精確檢驗的方差分析；P<0.05 時認爲具有統計學意義。
結果：Manujet 的氣流量和潮氣量是 ENK 的 3 倍（分別約爲 37 比 14 L·min ?1 和 700 比 250mL），且不依賴於呼吸頻率。在無通氣的情況下，ENK 傳輸 0.6 ±0.1 L·min-1 的恒定流量。在氣道完全閉塞時，經 Manujet 3 次噴射注氣法後，肺壓力升至 136 cm H2O，而 ENK 有一個壓力釋放排氣口，可在較低的呼吸頻率（4 次/分）時產生合適的氣壓（峰壓爲 27.7±0.7，呼氣末壓爲 18.8±3.8 cm H2O）。當呼吸頻率爲 12 次/分時，ENK 產生較高的壓力（峰壓爲 95.9±21.2，呼氣末壓爲 51.4±21.4 cm H2O）。在氣道部分阻塞時，Manujet 產生的肺壓力顯著大於 ENK，而且在兩種設備中，壓力均隨呼吸頻率而增加。最後，Manujet 所產生的氣流量和潮氣量隨驅動壓按比例發生變化。
討論：本研究證實了經氣管氧合時在 2 次噴射法注氣和維持低呼吸頻率之間讓氣體呼出的絕對必要性。在氣道完全阻塞時，使用 ENK 可能危害較小，因爲它有一個壓力釋放排氣口。用 Manujet 給予較低的驅動壓力，可以降低氣壓傷的風險，使它能夠在呼吸頻率較高時安全使用。
（瞿亦楓 譯 馬皓琳 李士通校）

BACKGROUND: The Manujet? and the ENK Oxygen Flow Modulator? (ENK) deliver oxygen during transtracheal oxygenation. We sought to describe the ventilation characteristics of these 2 devices.
METHODS: The study was conducted in an artificial lung model consisting of a 15-cm ringed tube, simulating the trachea, connected via a flow analyzer and an artificial lung.

A 15-gauge transtracheal wire reinforced catheter was used for transtracheal oxygenation. The ENK and Manujet were studied for 3 minutes at respiratory rates of 0, 4, and 12 breaths/min, with and without the artificial lung, in a totally and a partially occluded airway. Statistical analysis was performed using analysis of variance followed by a Fisher exact test; $P < 0.05$ was considered significant.
RESULTS: Gas flow and tidal volume were 3 times greater with the Manujet than the ENK (approximately 37 vs 14 L ·min?1 and 700 vs 250 mL, respectively) and were not dependent on the respiratory rate. In the absence of ventilation, the ENK delivered a 0.6 ± 0.1 L ·min?1 constant gas flow. In the totally occluded airway, lung pressures increased to 136 cm H2O after 3 insufflations with the Manujet, whereas the ENK, which has a pressure release vent, generated acceptable pressures at a low respiratory rate (4 breaths/min) (peak pressure at 27.7 ± 0.7 and end-expiratory pressure at 18.8 ± 3.8 cm H2O). When used at a respiratory rate of 12 breaths/min, the ENK generated higher pressures (peak pressure at 95.9 ± 21.2 and end-expiratory pressure at 51.4 ± 21.4 cm H2O). In the partially occluded airway, lung pressures were significantly greater with the Manujet compared with the ENK, and pressures increased with the respiratory rate with both devices. Finally, the gas flow and tidal volume generated by the Manujet varied proportionally with the driving pressure.
DISCUSSION: This study confirms the absolute necessity of allowing gas exhalation between 2 insufflations and maintaining low respiratory rates during transtracheal oxygenation. In the case of total airway obstruction, the ENK may be less deleterious because it has a pressure release vent. Using a Manujet at lower driving pressures may decrease the risk of barotrauma and allow the safe use of higher respiratory rates.

高仿真模擬表明麻醉醫生的年齡和自住院醫師以來的年份對急診環甲膜切開技術的影響

High-Fidelity Simulation Demonstrates the Influence of Anesthesiologists' Age and Years from Residency on Emergency Cricothyroidotomy Skills

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背景：大量研究表明隨著年齡增長，認知功能和對精細活動的控制力會逐漸衰退。然而對於複雜的臨床麻醉技能，這種衰退並未被闡明。環甲膜切開是臨床一種複雜的、可以挽救病人生命的操作，並且需要麻醉醫生同時具備良好的認識過程和精細活動控制力。精通此項技術在"無法插管，無法通氣"的情況下，對於重建病人吸氧通道極其重要。在這項前瞻性、對照、單盲研究中，我們在高仿真模擬"無法插管、無法通氣"的情況下，驗證年齡對經皮環甲膜切開學習和操作的影響。
方法：36 名麻醉醫生（19 名小於 45 歲，17 名大於 45 歲）在接受 1 小時的標準化培訓之前和之後分別處理在高仿真模擬器模擬的"無法插管、無法通氣"情境。基於

入選前我們的受試者樣本的年齡中位數，將分組的年齡界限定位 45 歲。類比的情境是需要麻醉醫生立行急診經皮環甲膜穿刺術。我們通過評價操作時間、5 分特定任務量表評分、整體等級評分比較高年資組與低年資組的環甲膜穿刺技術能力。比較兩組的年齡、住院醫師之後的年數、每週臨床工作時間、之前接受氣道管理的繼續醫學教育及之前的模擬經驗。
結果：標準化培訓前後，操作時間、特定任務量表評分、整體等級評分均與麻醉醫生的年齡和住院醫師之後的年份相關。平均年齡爲 37 歲的低年資組與平均年齡爲 58 歲的高年資組比較，低年資組的基礎值和培訓前的變數均好于高年資組。培訓前低年資組與高年資組相比，操作時間爲 100 (72-128)秒比 152 (120-261)秒，特定任務量表評分爲 7.0 (6.1-8.0)比 6.0 (4.8-8.0)，整體等級評分爲 22.0 (17.8-29.8)比 17.5 (10.4-20.6)。經過一小時的規範化培訓後，低年資組的表現仍比高年資組好，操作時間爲 75 (66-91)秒比 87 (78-123)秒，特定任務量表評分爲 10.0 (9.1-10.0)比 9.0 (8.0-10.0)，整體等級評分爲 35.0 (32.1-35.0)比 32.0 (29.0-33.8)。對規範化培訓後的資料進行回歸分析。麻醉醫生的年齡和住院醫師之後的年數均獨立地影響評價操作時間、特定任務量表評分和整體等級評分（所有 P 均小於 0.05）。
結論：對模擬的急診環甲膜穿刺操作熟練程度的基礎值與麻醉醫生的年齡和住院醫師之後的年數有關。儘管進行了規範化培訓，操作的熟練程度仍隨麻醉醫生年齡和住院醫師之後年數的增加呈下降趨勢。對年齡和住院醫師之後的年數作爲完成週期性繼續醫學教育的因素之一的可能性必須進行進一步研究。
（劉伍 譯 馬皓琳 李士通 校）
BACKGROUND: Age-related deterioration in both cognitive function and the capacity to control fine motor movements has been demonstrated in numerous studies. However, this decline has not been described with respect to complex clinical anesthesia skills. Cricothyroidotomy is an example of a complex, lifesaving procedure that requires competency in the domains of both cognitive processing and fine motor control. Proficiency in this skill is vital to minimize time to reestablish oxygenation during a "cannot intubate, cannot ventilate" scenario. In this prospective, controlled, single-blinded study, we tested the hypothesis that age affects the learning and performance of emergency percutaneous cricothyroidotomy in a high-fidelity simulated cannot intubate/cannot ventilate scenario.
METHODS: Thirty-six staff anesthesiologists (19 aged younger than 45 years and 17 older than 45 years) managed a high-fidelity cannot intubate/cannot ventilate scenario in a high-fidelity simulator before and after a 1-hour standardized training session. The group division cutoff age of 45 years was based on the median age of our sample subject population before enrollment. The scenarios required the insertion of an emergency percutaneous cricothyroidotomy. We compared cricothyroidotomy skills in the older group with those in the younger group using procedural time, 5-point task-specific checklist score, and global rating scale score. Correlation based on age, years from residency, weekly clinical hours worked, previous continuing medical education in airway management, and previous simulation experience was also performed.
RESULTS: In both prestandardization and poststandardization, age and years from residency correlated with procedural time, checklist scores, and global rating scores. Baseline, prestandardization variables were all better for the younger group, with a mean age of 37 years, compared with the older group, with a mean age of 58 years. Procedural

time was 100 (72-128) seconds versus 152 (120-261) seconds. Checklist scores were 7.0 (6.1-8.0) versus 6.0 (4.8-8.0). Global rating scale scores were 22.0 (17.8-29.8) versus 17.5 (10.4-20.6). After the 1-hour standardized training session, the younger group continued to perform better than the older group with procedural time of 75 (66-91) seconds versus 87 (78-123) seconds, checklist scores of 10.0 (9.1-10.0) versus 9.0 (8.0-10.0), and global rating scale scores of 35.0 (32.1-35.0) versus 32.0 (29.0-33.8). Regression analysis was performed on the poststandardization data. Both age and years from residency independently affected procedural time, checklist scores, and global rating scale scores (all $P < 0.05$).
CONCLUSIONS: Baseline proficiency with simulated emergency cricothyroidotomy is associated with age and years from residency. Despite standardized training, operator age and years from residency were associated with decreased proficiency. Further research should explore the potential of using age and years from residency as factors for implementing periodic continuing medical education.

時間生物學的缺陷：以鞘內注射布比卡因麻醉爲例的一個被建議的分析

Pitfalls in Chronobiology: A Suggested Analysis Using Intrathecal Bupivacaine Analgesia as an Example

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背景：已有研究顯示產婦硬膜外給予局部麻醉藥的鎮痛持續時間隨著不同的給藥時間呈現一定的節律模式。我們的研究是爲了確定產婦鞘內注射布比卡因後是否會遵循同樣的模式。分析的過程中，我們逐漸發現，一些與醫護人員交接班相一致的資料點會受到非生物、醫療保健制度因素的影響，因此才錯誤地提示了分娩鎮痛持續時間的週期信號。我們開發了圖形和分析工具以助於評估個別資料點對時間生物學分析的影響。
方法：單胎足月妊娠、頂先露、宮口擴張 3-5cm、疼痛評分>50mm（最痛爲 100mm）且要求分娩鎮痛的產婦入組本研究。應用腰硬聯合麻醉技術，先給予患者鞘內注射 2.5mg 布比卡因 2mL，從鞘內注藥到第一次要求額外鎮痛的時間記爲鎮痛持續時間。鎮痛持續時間的分析採用資料目視檢測、光滑函數（超光平滑法；LOWESS 和 LOESS【局部加權回歸散點光滑函數】）、方差分析、余弦（時間吻合）、Excel 和 NONMEM（非線性混合效應模型法）。利用 PLT 工具對可信區間（CIs）進行引導分析（用取代進行 1000 次複製抽樣）。
結果：82 名婦女被納入研究。利用 3 階平滑函數檢查的原始資料，呈現一個雙峰模式，一個峰大約位於 06:30，隨後一個峰位於下午或晚上，取決於其平滑度。午夜至 06:00 鞘內注射時的鎮痛持續時間與其他時間鞘內注射後的鎮痛持續時間相比

方差分析並沒有明顯的統計學差異。余弦分析、Excel 和 NONMEM 都得到了一致的結果：鎮痛持續時間平均爲 38.4 分鐘（95%可信區間：35.4-41.6 分鐘），波形週期爲 8 小時，振幅爲 5.8 分鐘（95%可信區間：2.1-10.7 分鐘），相位偏差爲 6.5 小時（95%可信區間：5.4-8.0 小時）。在 40%的引導分析中 8 小時週期模型並沒有統計學意義，提示 8 小時週期模型的統計學意義取決於資料子集。在 07:00 換班前的兩個數據點對週期波形的統計學意義的影響最大。沒有這些資料點，就沒有證據證明鞘內注射布比卡因鎮痛呈 8 小時週期波形。

結論：時間生物學包括所在環境中外界晝夜節律（例如護理交班）和人體生物節律的影響。我們可以聯合幾種新的分析方法來區分外界節律的影響：（1）疊加原始資料、外界節律（比如，護理和麻醉交接班）和光滑函數的圖示；（2）每一個數據點對統計學意義的影響的圖示；（3）用來判斷統計學意義是否高度依賴於資料子集的引導分析。這些方法提示，兩個數據點的變化可能與護理和麻醉交接班有關。如果去掉這些點，即無法證明鞘內注射布比卡因鎮痛持續時間有生物學節律。（徐妍君 譯　馬皓琳 李士通 校）

BACKGROUND: The duration of analgesia from epidural administration of local anesthetics to parturients has been shown to follow a rhythmic pattern according to the time of drug administration. We studied whether there was a similar pattern after intrathecal administration of bupivacaine in parturients. In the course of the analysis, we came to believe that some data points coincident with provider shift changes were influenced by nonbiological, health care system factors, thus incorrectly suggesting a periodic signal in duration of labor analgesia. We developed graphical and analytical tools to help assess the influence of individual points on the chronobiological analysis.

METHODS: Women with singleton term pregnancies in vertex presentation, cervical dilation 3 to 5 cm, pain score >50 mm (of 100 mm), and requesting labor analgesia were enrolled in this study. Patients received 2.5 mg of intrathecal bupivacaine in 2 mL using a combined spinal-epidural technique. Analgesia duration was the time from intrathecal injection until the first request for additional analgesia. The duration of analgesia was analyzed by visual inspection of the data, application of smoothing functions (Supersmoother; LOWESS and LOESS [locally weighted scatterplot smoothing functions]), analysis of variance, Cosinor (Chronos-Fit), Excel, and NONMEM (nonlinear mixed effect modeling). Confidence intervals (CIs) were determined by bootstrap analysis (1000 replications with replacement) using PLT Tools.

RESULTS: Eighty-two women were included in the study. Examination of the raw data using 3 smoothing functions revealed a bimodal pattern, with a peak at approximately 0630 and a subsequent peak in the afternoon or evening, depending on the smoother. Analysis of variance did not identify any statistically significant difference between the duration of analgesia when intrathecal injection was given from midnight to 0600 compared with the duration of analgesia after intrathecal injection at other times. Chronos-Fit, Excel, and NONMEM produced identical results, with a mean duration of analgesia of 38.4 minutes (95% CI: 35.4-41.6 minutes), an 8-hour periodic waveform with an amplitude of 5.8 minutes (95% CI: 2.1-10.7 minutes), and a phase offset of 6.5 hours (95% CI: 5.4-8.0 hours) relative to midnight. The 8-hour periodic model did not reach statistical significance in 40% of bootstrap analyses, implying that statistical significance of the 8-hour periodic model was dependent on a subset of the data. Two data points before the change of shift at 0700 contributed most strongly to the statistical

significance of the periodic waveform. Without these data points, there was no evidence of an 8-hour periodic waveform for intrathecal bupivacaine analgesia.
CONCLUSION: Chronobiology includes the influence of external daily rhythms in the environment (e.g., nursing shifts) as well as human biological rhythms. We were able to distinguish the influence of an external rhythm by combining several novel analyses: (1) graphical presentation superimposing the raw data, external rhythms (e.g., nursing and anesthesia provider shifts), and smoothing functions; (2) graphical display of the contribution of each data point to the statistical significance; and (3) bootstrap analysis to identify whether the statistical significance was highly dependent on a data subset. These approaches suggested that 2 data points were likely artifacts of the change in nursing and anesthesia shifts. When these points were removed, there was no suggestion of biological rhythm in the duration of intrathecal bupivacaine analgesia.

輸注右美托咪定用於接受增殖腺扁桃體切除術的阻塞性睡眠呼吸暫停綜合征患兒的術後鎮痛以及預防躁動

Dexmedetomidine Infusion for Analgesia and Prevention of Emergence Agitation in Children with Obstructive Sleep Apnea Syndrome Undergoing Tonsillectomy and Adenoidectomy

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背景：右美托咪定是一種特異性α2 激動劑，具有節省鎮痛藥的作用並且能減少躁動。我們在接受增殖腺扁桃體切除術（T&A）的阻塞性睡眠呼吸暫停綜合征患兒中比較了術中輸注右美托咪定與單次劑量的芬太尼對圍術期阿片類藥物的使用及蘇醒期躁動的減少作用。
方法：122 名年齡 2 至 10 歲，接受 T&A（增殖腺扁桃體切除術）的阻塞性睡眠呼吸暫停綜合征患者完成了這項前瞻性、隨機性的美國食品和藥物管理局許可的研究。通過面罩七氟烷誘導後，D 組接受靜脈輸注右美托咪定 2 μg · kg?1 10 分鐘後改爲 0.7 μg · kg?1 · h-1，F 組接受單次靜脈注射芬太尼 1 μg · kg?1 。麻醉由七氟烷、氧氣一氧化亞氮維持。術中心率或收縮壓比手術前水準高 30%並持續超過 5 分鐘則給予芬太尼 0.5~1 μg · kg?1 。麻醉後恢復室（PACU）中的觀察者對於組別是盲法的。用客觀疼痛評分評估患者送至 PACU 當刻、5 分鐘、15 分鐘以及隨後的 120 分鐘內每 15 分鐘時刻的疼痛評分。相同的時間間隔內通過兩種尺度評估蘇醒期躁動：小兒麻醉的蘇醒譫妄量表以及科爾描述的 5 分制量表。若疼痛評分超過四分或者嚴重躁動（4 分或 5 分）持續超過 5 分鐘則給予嗎啡 0.05~0.1mg · kg?1 。
結果：D 組中 9.8%的患者需要術中增加芬太尼，而 F 組則是 36%（P = 0.001）。D 組平均收縮壓以及心率明顯較低（P < 0.05）。最低肺泡有效濃度在兩組之間有顯著差異（P = 0.015）。D 組客觀疼痛評分中位數是 3，而 F 組爲 5 (P = 0.001)。D

組中 10 位元患者（16.3%）需要接受嗎啡，而 F 組則 29 位元（47.5%）需要嗎啡治療(P = 0.002)。到達 PACU 當刻發生嚴重蘇醒期躁動的發生率 D 組爲 18%，而 F 組爲 45.9% (P = 0.004)；在 5 分鐘以及 15 分鐘時，D 組躁動的發生率較低(P = 0.028)。科爾量表上躁動的持續時間 D 組明顯較短(P = 0.004)。18%的 D 組患者以及 40.9%的 F 組患者發生脈搏氧飽和度低於 95%的事件。

結論：術中輸注右美托咪定聯合吸入麻醉藥可爲 T&A（增殖腺扁桃體切除術）提供滿意的手術條件，且無血流動力學的不良反應。術後阿片類藥物需求顯著減少，蘇醒期嚴重躁動的發生減少以及持續時間縮短，而且較少數病人發生了氧飽和度下降的事件。

（龔寅 譯 馬皓琳 李士通 校）

BACKGROUND: Dexmedetomidine, a specific α2 agonist, has an analgesic-sparing effect and reduces emergence agitation. We compared an intraoperative dexmedetomidine infusion with bolus fentanyl to reduce perioperative opioid use and decrease emergence agitation in children with obstructive sleep apnea syndrome undergoing adenotonsillectomy (T&A).

METHODS: One hundred twenty-two patients with obstructive sleep apnea syndrome undergoing T&A, ages 2 to 10 years, completed this prospective, randomized, U.S. Food and Drug Administration-approved study. After mask induction with sevoflurane, group D received IV dexmedetomidine 2 μg · kg?1 over 10 minutes, followed by 0.7 μg · kg?1 · h-1, and group F received IV fentanyl bolus 1 μg · kg?1. Anesthesia was maintained with sevoflurane, oxygen, and nitrous oxide. Fentanyl 0.5 to 1 μg · kg?1 was given to subjects in both groups for an increase in heart rate or systolic blood pressure 30% above preincision values that continued for 5 minutes. Observers in the postanesthesia care unit (PACU) were blinded to treatment groups. Pain was evaluated using the objective pain score in the PACU on arrival, at 5 minutes, at 15 minutes, then every 15 minutes for 120 minutes. Emergence agitation was evaluated at the same intervals by 2 scales: the Pediatric Anesthesia Emergence Delirium scale and a 5-point scale described by Cole. Morphine (0.05 to 0.1 mg ·kg?1) was given for pain (score >4) or severe agitation (score 4 or 5) lasting more than 5 minutes.

RESULTS: In group D, 9.8% patients needed intraoperative rescue fentanyl in comparison with 36% in group F (P = 0.001). Mean systolic blood pressure and heart rate were significantly lower in group D (P < 0.05). Minimum alveolar concentration values were significantly different between the 2 groups (P = 0.015). The median objective pain score was 3 for group D and 5 for group F (P = 0.001). In group D, 10 (16.3%) patients required rescue morphine, in comparison with 29 (47.5%) in group F (P = 0.002). The frequency of severe emergence agitation on arrival in the PACU was 18% in group D and 45.9% in group F (P = 0.004); at 5 minutes and at 15 minutes, it was lower in group D (P = 0.028). The duration of agitation on the Cole scale was statistically lower in group D (P = 0.004). In group D, 18% of patients and 40.9% in group F had an episode of SPO2 below 95% (P = 0.01).

CONCLUSIONS: An intraoperative infusion of dexmedetomidine combined with inhalation anesthetics provided satisfactory intraoperative conditions for T&A without adverse hemodynamic effects. Postoperative opioid requirements were significantly reduced, and the incidence and duration of severe emergence agitation was lower with fewer patients having desaturation episodes.

比較七氟烷和異丙酚麻醉下入肝血流阻斷肝葉切除術後的肝功能

A Comparison of Liver Function After Hepatectomy with Inflow Occlusion Between Sevoflurane and Propofol Anesthesia

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背景：本次研究中，我們比較了異丙酚 VS 七氟烷麻醉對入肝血流阻斷肝葉切除術後肝功能的影響。
方法：一百名擇期入肝血流阻斷肝葉切除術患者隨機分成七氟烷組或異丙酚組。全身麻醉誘導使用 3 μg/kg 芬太尼、0.2 mg/kg 順阿曲庫銨和靶控輸注異丙酚(血漿靶濃度設爲 4~6 μg/mL)或者起始濃度爲 8%的七氟烷。麻醉維持用靶控輸注異丙酚（2-4 μg/mL）或者七氟烷(1.5%-2.5%)。通過肝臟轉氨酶峰值評估術後肝損傷，把術後肝損傷作爲主要終點事件。
結果：轉氨酶峰值出現在術後第一天和第三天之間。七氟烷組和異丙酚組丙氨酸氨基轉移酶峰值分別是 504 和 507 U/L。七氟烷組天冬氨酸氨基轉移酶峰值爲 435U/L，異丙酚組爲 581 U/L。兩組的丙氨酸氨基轉移酶峰值或天冬氨酸氨基轉移酶峰值均無明顯差異。兩組其他肝功能檢測包括膽紅素和鹼性磷酸酶及白細胞計數峰值和肌酐也無差異。
結論：在入肝血流阻斷肝葉切除術後，七氟烷和異丙酚麻醉藥有類似的肝臟功能檢測結果。這些資料表明，在臨床情況下兩個麻醉藥是等效的。
（王海濤 譯，馬皓琳，李士通 校）

BACKGROUND: In this study, we compared liver function tests after hepatectomy with inflow occlusion as a function of propofol versus sevoflurane anesthesia.
METHODS: One hundred patients undergoing elective liver resection with inflow occlusion were randomized into a sevoflurane group or a propofol group. General anesthesia was induced with 3 μg/kg fentanyl, 0.2 mg/kg cisatracurium, and target-controlled infusion of propofol, set at a plasma target concentration of 4 to 6 μg/mL, or sevoflurane initially started at 8%. Anesthesia was maintained with target-controlled infusion of propofol (2-4 μg/mL) or sevoflurane (1.5%-2.5%). The primary end point was postoperative liver injury assessed by peak values of liver transaminases.
RESULTS: Transaminase levels peaked between the first and the third postoperative day. Peak alanine aminotransferase was 504 and 571 U/L in the sevoflurane group and the propofol group, respectively. Peak aspartate aminotransferase was 435 U/L after sevoflurane and 581 U/L in the propofol group. There were no significant differences in peak alanine aminotransferase or peak aspartate aminotransferase between groups. Other liver function tests including bilirubin and alkaline phosphatase, and peak values of white blood cell counts and creatinine, were also not different between groups.

CONCLUSIONS: Sevoflurane and propofol anesthetics resulted in similar patterns of liver function tests after hepatectomy with inflow occlusion. These data suggest that the 2 anesthetics are equivalent in this clinical context.

正中神經和尺神經阻滯的最低有效麻醉藥容積的評估和藥效動力學結果：一項比較超聲和神經刺激引導下進行的隨機、雙盲、對照研究

Estimation and Pharmacodynamic Consequences of the Minimum Effective Anesthetic Volumes for Median and Ulnar Nerve Blocks: A Randomized, Double-Blind, Controlled Comparison Between Ultrasound and Nerve Stimulation Guidance

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背景：神經刺激和超聲引導是外周神經阻滯最常用的技術。然而，兩種技術下特定神經的最低有效麻藥容積（MEAV）和降低局部麻醉藥容積引起的神經阻滯藥效學特徵至今未被研究。我們對神經刺激和超聲引導進行隨機、雙盲、對照的比較，以評估在正中神經及尺神經阻滯中 1.5%甲呱卡因的 MEAV 和藥效動力學。
方法：預定行腕管松解的患者被隨機分爲超聲引導（UG）或神經刺激（NS）組。用一個逐步升降式研究模型（Dixon 方法），即根據前一患者結果進行的非概率序貫定量，來確定 MEAV。1.5%的甲呱卡因在肱骨的正中神經和尺神經處的初始劑量是 13 和 11ml。阻滯成功/失敗則減少/增加 2ml。安排一位不知情的醫生在 20 分鐘內每 2 分鐘評估一次感覺阻滯效果。記錄阻滯起效時間和持續時間。
結果：正中神經 MEAV50（SD），在 UG 組爲 2(0.1)ml(95% 置信區間[CI] = [1, 96]到[2, 04])，比 NS 組的 4（3.8）ml(95% CI = [2, 4]到[5, 6]) 要低(P = 0.017)。而尺神經 MEAV50（SD），UG 組爲 2 (0.1) mL (95% CI = [1, 96]到[2, 04]) ，NS 組爲 2.4 (0.6) mL (95% CI = [2, 1]到[2, 7])，兩組無差異。局部麻醉藥容積與感覺阻滯持續時間顯著相關，而與起效時間無關。
結論：與神經刺激方法相比，超聲引導可選擇性地使用于正中神經感覺阻滯的 1.5%甲呱卡因 MEAV 降低 50%。減小局部麻醉藥容積能減少感覺阻滯持續時間，但對起效時間無影響。
（楊秀娟 譯 李士通 馬皓琳 校）

BACKGROUND: Nerve stimulation and ultrasound guidance are the most popular techniques for peripheral nerve blocks. However, the minimum effective anesthetic volume (MEAV) in selected nerves for both techniques and the consequences of

decreasing the local anesthetic volume on the pharmacodynamic characteristics of nerve block remain unstudied. We designed a randomized, double-blind controlled comparison between neurostimulation and ultrasound guidance to estimate the MEAV of 1.5% mepivacaine and pharmacodynamics in median and ulnar nerve blocks.
METHODS: Patients scheduled for carpal tunnel release were randomized to ultrasound guidance (UG) or neurostimulation (NS) groups. A step-up/step-down study model (Dixon method) was used to determine the MEAV with nonprobability sequential dosing based on the outcome of the previous patient. The starting dose of 1.5% mepivacaine was 13 and 11 mL for median and ulnar nerves at the humeral canal. Block success/failure resulted in a decrease/increase of 2 mL. A blinded physician assessed sensory blockade at 2-minute intervals for 20 minutes. Block onset time and duration were noted.
RESULTS: The MEAV50 (SD) of the median nerve was lower in the UG group 2 (0.1) mL (95% confidence interval [CI] = [1, 96] to [2, 04]) than in the NS group 4 (3.8) mL (95% CI = [2, 4] to [5, 6]) (P = 0.017). There was no difference for the ulnar nerve between UG group 2 (0.1) mL (95% CI = [1, 96] to [2, 04]) and NS group 2.4 (0.6) mL (95% CI = [2, 1] to [2, 7]). The duration of sensory blockade was significantly correlated to local anesthetic volume, but onset time was not modified.
CONCLUSION: Ultrasound guidance selectively provided a 50% reduction in the MEAV of mepivacaine 1.5% for median nerve sensory blockade in comparison with neurostimulation. Decreasing the local anesthetic volume can decrease sensory block duration but not onset time.

比較加溫加濕器和熱量濕度交換器用於通氣的成人和兒童

Heated Humidification Versus Heat and Moisture Exchangers for Ventilated Adults and Children

M Kelly, D Gillies, DA Todd, C Lockwood .
Cochrane Database Syst Rev 2010, Issue 4. Art. No.: CD004711.
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背景：在機械通氣過程中上呼吸道爲旁路時，必須通過人工方法給予加濕。在這種情況下，加熱加濕器（HH）和熱量濕度交換器（HMEs）是最常用的人工濕化類型。
目的：確定 HHs 和 HMEs 哪種加濕方法能夠更有效地預防機械通氣患者死亡和其他併發症。
檢索方法：我們搜索了 Cochrane 的對照試驗中央寄存器(Cochrane 書庫 2010, 第 4 期)、MEDLINE、EMBASE 和 CINAHL（2010 年 1 月）來辨別出相關的隨機對照試驗。
選擇標準：我們入選了在機械通氣的成人和新生兒中比較 HMEs 和 HHs 的隨機對照試驗。我們也入選了隨機交叉研究。
資料收集和分析：我們評估了每個研究的品質並提取有關資料。對從合適的有關研究得到的結果進行薈萃分析以得出個別結果。
主要結果：我們入選了 33 項試驗，共 2833 例。25 項研究（n=2710）是平行組設計，8 項研究（n=123）是交叉組設計。只有 3 項入選的研究報導了嬰兒或兒童的

資料。沒有關於人工氣道阻塞、死亡率、肺炎或呼吸系統併發症的總效應；但是，HMEs 與 HHs 比較，PaCO2 和分鐘通氣量增加且體溫較低。在所有報導費用的研究中 HMEs 的費用較低。有一些證據表明，忌水性的 HMEs 可能降低了肺炎的風險，而人工氣道堵塞的增多可能與某些亞組患者應用 HMEs 有關。

作者的結論：幾乎無證據證明 HMEs 和 HHs 之間有總體差異。而忌水性 HMEs 可能降低了肺炎的風險，也可能增加了某些亞組患者人工氣道阻塞的發生。因此，HMEs 可能並不適用於呼吸儲備有限或易發生氣道阻塞的患者。關於忌水性和吸濕性 HMEs 的比較以及 HMEs 在兒童和新生兒人群中的使用還需要進一步的研究。由於 HMEs 的設計進展，還需要進行對新一代 HMEs 的評估。

（滕淩雅 譯 馬皓琳 李士通 校）

BACKGROUND: Humidification by artificial means must be provided when the upper airway is bypassed during mechanical ventilation. Heated humidification (HH) and heat and moisture exchangers (HMEs) are the most commonly used types of artificial humidification in this situation.

OBJECTIVES: To determine whether HHs or HMES are more effective in preventing mortality and other complications in people who are mechanically ventilated.

SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (The Cochrane Library 2010, Issue 4) and MEDLINE, EMBASE and CINAHL (January, 2010) to identify relevant randomized controlled trials.

SELECTION CRITERIA: We included randomized controlled trials comparing HMEs to HHs in mechanically ventilated adults and children. We included randomized crossover studies.

DATA COLLECTION AND ANALYSIS: We assessed the quality of each study and extracted the relevant data. Where appropriate, results from relevant studies were meta-analyzed for individual outcomes.

MAIN RESULTS: We included 33 trials with 2833 participants; 25 studies were parallel group design (n = 2710) and 8 crossover design (n = 123). Only 3 included studies reported data for infants or children. There was no overall effect on artificial airway occlusion, mortality, pneumonia, or respiratory complications; however, the PaCO2 and minute ventilation were increased when HMEs were compared to HHs and body temperature was lower. The cost of HMEs was lower in all studies that reported this outcome. There was some evidence that hydrophobic HMEs may reduce the risk of pneumonia and that blockages of artificial airways may be increased with the use of HMEs in certain subgroups of patients.

AUTHORS' CONCLUSIONS: There is little evidence of an overall difference between HMEs and HHs. However, hydrophobic HMEs may reduce the risk of pneumonia and the use of an HMEs may increase artificial airway occlusion in certain subgroups of patients. Therefore, HMEs may not be suitable for patients with limited respiratory reserve or prone to airway blockage. Further research is needed relating to hydrophobic versus hygroscopic HMEs and the use of HMEs in the pediatric and neonatal populations. As the design of HMEs evolves, evaluation of new generation HMEs will also need to be undertaken.

冠狀動脈搭橋術中使用低濃度肝素患者肝素劑量反應與術前抗凝血酶活性無關

Heparin Dose Response Is Independent of Preoperative Antithrombin Activity in Patients Undergoing Coronary Artery Bypass Graft Surgery Using Low Heparin Concentrations

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背景：普通肝素主要作用爲提高抗凝血酶（AT）的活性。作者推測冠脈搭橋術患者術前的 AT 活性與肝素劑量反應（HDR）及肝素敏感指數（HSI）有關。
方法：收集 304 例首次接受冠狀動脈搭橋術患者的個人資訊及圍手術期的資料。全身麻醉誘導後測定 AT 的活性，用比色測定法（Siemens Healthcare Diagnostics, Tarrytown, NY）。啓動凝血酶原時間（ACT），肝素劑量反應（HDR），以及 HSI 均採用 Hepcon HMS Plus 系統（Medtronic, Minneapolis, MN）檢測。根據相同系統測出的 HDR 來設定相應肝素劑量。採用多元線性回歸分析來確定肝素劑量反應（HDR）的獨立危險因素。並選取可能出現肝素抵抗的 AT 活性較低患者（<正常的 80%; <0.813 U/mL）作爲亞組進行分析。
結果： 基礎啓動凝血酶原時間（ACT）平均值爲 135 ± 18 秒。肝素劑量反應（HDR）平均值爲 98 ± 21 s/U/mL。AT 活性平均值爲 0.93 ± 0.13 U/mL，基礎 AT 活性與 ACT, HDR,或 HIS 基礎值及肝素化值沒有明顯關聯。在包含 HDR 及 HIS 的多變數線性回歸模型中增加 AT 活性因素，並沒有顯著提高模型的性能。亞組 49 例 AT 活性<正常的 80%分析結果爲較低 AT 活性與 HDR 或 HIS 沒有明顯關聯。術前 AT 活性，HDR 及 HSI 與術後第一天心肌肌鈣蛋白 I 水準，ICU 時間，或住院時間沒有關聯。
結論：雖然提高 AT 活性是肝素促進體外迴圈抗凝的主要機制，但是 ACTs 爲 300 至 350 秒時，術前較低的 AT 活性與肝素反應受損或臨床結果沒有相關性。
（陳毓雯　譯　陳傑　校）
BACKGROUND: Unfractionated heparin's primary mechanism of action is to enhance the enzymatic activity of antithrombin (AT). We hypothesized that there would be a direct association between preoperative AT activity and both heparin dose response (HDR) and heparin sensitivity index (HSI) in patients undergoing coronary artery bypass graft surgery.
METHODS: Demographic and perioperative data were collected from 304 patients undergoing primary coronary artery bypass graft surgery. AT activity was measured after induction of general anesthesia using a colorimetric method (Siemens Healthcare Diagnostics, Tarrytown, NY). Activated coagulation time (ACT), HDR, and HSI were measured using the Hepcon HMS Plus system (Medtronic, Minneapolis, MN). Heparin dose was calculated for a target ACT using measured HDR by the same system. Multivariate linear regression was performed to identify independent predictors of HDR.

Subgroup analysis of patients with low AT activity (<80% normal; <0.813 U/mL) who may be at risk for heparin resistance was also performed.
RESULTS: Mean baseline ACT was 135 ± 18 seconds. Mean calculated HDR was 98 ± 21 s/U/mL. Mean baseline AT activity was 0.93 ± 0.13 U/mL. Baseline AT activity was not significantly associated with baseline or postheparin ACT, HDR, or HSI. Addition of AT activity to multivariable linear regression models of both HDR and HSI did not significantly improve model performance. Subgroup analysis of 49 patients with baseline AT <80% of normal levels did not reveal a relationship between low AT activity and HDR or HSI. Preoperative AT activity, HDR, and HSI were not associated with cardiac troponin I levels on the first postoperative day, intensive care unit duration, or hospital length of stay.
CONCLUSION: Although enhancing AT activity is the primary mechanism by which heparin facilitates cardiopulmonary bypass anticoagulation, low preoperative AT activity is not associated with impaired response to heparin or to clinical outcomes when using target ACTs of 300 to 350 seconds.

在氣管導管套囊上分別噴射鹽酸消炎痛、10%利多卡因和 2%利多卡因對術後喉痛的作用

Effect on Postoperative Sore Throat of Spraying the Endotracheal Tube Cuff with Benzydamine Hydrochloride, 10% Lidocaine, and 2% Lidocaine

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Anesth Analg October 2010 111:882-886;

背景：術後喉痛（POST）是氣管插管後的常見併發症。本研究的目的是比較氣管導管套囊上噴射鹽酸消炎痛、10%利多卡因或 2%利多卡因後術後因氣管插管引起的喉痛的差異。
方法：372 例患者隨機分成 4 組。4 組患者分別在插管前於氣管導管套囊上噴射鹽酸消炎痛、10%利多卡因、2%利多卡因或生理鹽水。插管後，給套管充氣使氣道壓力在 20cmH2O。丙泊酚維持麻醉。分別于拔管後 1、6、12、24h 測試病人的喉痛程度（沒有，輕微，中度或者重度）。
結果： 4 組患者插管後喉痛發生率最高的時間均在拔管後 6h]。在各個觀察點上，消炎痛組患者喉痛發生率均顯著低於 10%利多卡因組、2%利多卡因組和生理鹽水組（p<0.05）。拔管後 6h，消炎痛組術後喉痛的發生率（17%）也低於 10%利多卡因組（53.7%）、2%利多卡因組（37%）和生理鹽水組（40.8%）（p<0.05）。與其他 3 組相比，在各個觀察時間點上，消炎痛組術後喉痛的嚴重程度低於其他組（p<0.05）。另外，本研究發現，在拔管後 1、6 和 12h 這 3 個觀察點上，與 2%利多卡因組和生理鹽水組相比，10%利多卡因組明顯增加了喉嚨痛的嚴重程度。局部和全身副反應，各組間無明顯差別。

結論：爲了減少術後喉痛的發生率和嚴重程度，於氣管導管套囊上噴鹽酸消炎痛是一種簡單有效的方法。
（張婷　譯　陳傑　校）
BACKGROUND: Postoperative sore throat (POST) is a common complication after endotracheal intubation. We compared the effectiveness on POST of spraying the endotracheal tube (ETT) cuff with benzydamine hydrochloride, 10% lidocaine, and 2% lidocaine.
METHODS: Three hundred seventy-two patients were randomly allocated into 4 groups. The ETT cuffs in each group were sprayed with benzydamine hydrochloride, 10% lidocaine hydrochloride, 2% lidocaine hydrochloride, or normal saline before endotracheal intubation. After insertion, the cuffs were inflated to an airway leak pressure of 20 cm H2O. Anesthesia was maintained with propofol. The patients were examined for sore throat (none, mild, moderate, or severe) at 1, 6, 12, and 24 hours after extubation.
RESULTS: The highest incidence of POST occurred at 6 hours after extubation in all groups. There was a significantly lower incidence of POST in the benzydamine group than 10% lidocaine, 2% lidocaine, and normal saline groups ($P < 0.05$) at each observation time point. At 6 hours after extubation, the incidence of POST was significantly lower in the benzydamine group (17.0%) compared with 10% lidocaine (53.7%), 2% lidocaine (37.0%), and normal saline (40.8%) groups ($P < 0.05$). The benzydamine group had significantly decreased severity of POST compared with the 10% lidocaine, 2% lidocaine, and normal saline groups ($P < 0.05$) at each observation time point. Compared with the 2% lidocaine and normal saline groups, the 10% lidocaine group had significantly increased severity of POST at 1, 6, and 12 hours after extubation. There were no significant differences among groups in local or systemic side effects.
CONCLUSIONS: Spraying benzydamine hydrochloride on the ETT cuff is a simple and effective method to reduce the incidence and severity of POST.

吸入氟替卡松丙酸酯減少術後喉痛、咳嗽、聲音嘶啞

Inhaled Fluticasone Propionate Reduces Postoperative Sore Throat, Cough, and Hoarseness

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背景：喉痛是術後常見併發症。術後咳嗽及聲音嘶啞也會使患者感到痛苦。作者擬確定吸入甾體類化合物對術後 24h 內喉痛、咳嗽、聲嘶的影響。
方法：研究納入了 120 名婦女，爲單胎妊娠，ASA I－II 級，擇期全麻下行剖宮產術。隨機分爲 2 組，F 組產婦到達手術室後取坐位，在 2 次深呼吸間通過一個隔離裝置吸入 500ug 氟替卡松丙酸酯，C 組產婦爲空白對照。術後 1h 和術後 24h 接受調查者有關術後喉痛、咳嗽、聲嘶的詢問。
結果：兩組在年齡、身高、體重、體重指數、手術時間、插管及喉部暴露程度上沒有顯著差異。術後 1 小時 F 組喉痛、咳嗽、聲嘶的發生率（分別爲 3.33%,3.33%,3.33%）較 C 組（分別爲 36.67%,18.33%,35%）顯著降低(P < 0.05)，

術後 24 小時 F 組（13.33%,13.33%,25%）也比 C 組(40%,41.67%,50%)低。術後 1h F 組中重度聲嘶的發生率比 C 組也顯著降低（P < 0.05）。
結論：吸入氟替卡松丙酸酯能降低全麻下行剖宮產術患者的術後喉痛、咳嗽、聲音嘶啞的發生率和嚴重程度。
（唐穎　譯　陳傑　校）
BACKGROUND: Sore throat is a common complication after surgery. Postoperative cough and hoarseness can also be distressing to patients. We sought to determine the effect of an inhaler steroid on sore throat, cough, and hoarseness during the first 24 hours of the postoperative period.
METHODS: We enrolled 120 women with ASA physical status I or II and term singleton pregnancy who were scheduled for elective cesarean delivery under general anesthesia. Patients were randomized into 2 groups: in the sitting position, group F patients received 500 μg inhaled fluticasone propionate via a spacer device during 2 deep inspirations, after arrival in the operating room, and group C had no treatment. The patients were interviewed by a blinded investigator for postoperative sore throat, cough, and hoarseness at 1 and 24 hours after surgery.
RESULTS: There were no significant differences in age, height, weight, body mass index, duration of surgery, intubation, and grade of laryngeal exposure between the 2 groups. The incidence of sore throat, cough, and hoarseness was significantly lower in group F (3.33%, 3.33%, and 3.33%) compared with the control group (36.67%, 18.33%, and 35%) ($P < 0.05$ for all comparisons), not only in the first postoperative hour but also 24 hours after surgery (13.33%, 13.33%, and 25% in group F vs 40%, 41.67%, and 50% in the control group). The incidence of moderate and severe hoarseness in group F at the first hour was significantly less than the control group ($P < 0.05$).
CONCLUSIONS: Inhaled fluticasone propionate decreases the incidence and severity of postoperative sore throat, cough, and hoarseness in patients undergoing cesarean delivery under general anesthesia.

一項對輔助控制通氣期間使用 Autoflow 模式的遠期臨床評估：隨機對照研究

A Long-Term Clinical Evaluation of AutoFlow During Assist-Controlled Ventilation: A Randomized Controlled Trial

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背景：許多新機械通氣模式並未經過任何臨床研究。“雙控模式”，例如自由呼吸的開放模式(AutoFlow)，用於促進人機協調並減少報警。作者設計了一項長期的臨床研究，來評估輔助通氣模式下採用 AutoFlow 的安全性和有效性，其中以報警爲關注點。
方法：將 42 例使用 Dräger Evita 4 呼吸機，機械通氣大於兩天的成年人，隨機分爲兩組，分別使用常規通氣模式（n=21）和 AutoFlow 模式（n=21）。由護士根據指

南給予鎮靜。將呼吸機日誌中所有的報警資料記錄在電腦上。記錄每天的血氣分析和通氣結果。
結果：研究 403 天 8074 個小時機械通氣記錄和 45022 個報警資料。呼吸頻率，分鐘通氣量，吸入氧濃度，呼氣末正壓，氧合指數，動脈血二氧化碳分壓，血液酸鹼度，鎮靜藥劑量和持續時間，在兩組間沒有顯著差異。各患者轉歸（持續性機械通氣，呼吸機相關肺炎，SOFA 評分，或死亡）也無顯著差異。AutoFlow 每小時報警量（3.3【1.5~19】）較常規輔助通氣爲（9.1【5~19】），P<0.0001（中位數【四分位間距】）少。通過多元分析，報警率降低與 AutoFlow 和高劑量咪達唑侖的使用相關。
結論：這次遠期臨床研究證明 AutoFlow 模式在氣體交換和患者轉歸方面均比較安全，且可顯著降低通氣報警次數。
（楊秋娟　譯　陳傑　校）

BACKGROUND: Many new mechanical ventilation modes are proposed without any clinical evaluation. “Dual-controlled” modes, such as AutoFlow™, are supposed to improve patient– ventilator interfacing and could lead to fewer alarms. We performed a long-term clinical evaluation of the efficacy and safety of AutoFlow during assist-controlled ventilation, focusing on ventilator alarms.
METHODS: Forty-two adult patients, receiving mechanical ventilation for more than 2 days with a Dräger Evita 4 ventilator were randomized to conventional (*n* = 21) or AutoFlow (*n* = 21) assist-controlled ventilation. Sedation was given using a nurse-driven protocol. Ventilator-generated alarms were exhaustively recorded from the ventilator logbook with a computer. Daily blood gases and ventilation outcome were recorded.
RESULTS: A total of 403 days of mechanical ventilation were studied and 45,022 alarms were recorded over a period of 8074 hours. The course of respiratory rate, minute ventilation, Fio2, positive end-expiratory pressure, Pao2/Fio2, Paco2, and pH and doses and duration of sedation did not differ between the 2 groups. Outcome (duration of mechanical ventilation, ventilator-associated pneumonia, course of Sequential Organ Failure Assessment score, or death) was not different between the 2 groups. The number of alarms per hour was lower with AutoFlow assist-controlled ventilation: 3.3 [1.5 to 17] versus 9.1 [5 to 19], $P < 0.0001$ (median [quartile range]). In multivariate analysis, a low alarm rate was associated with activation of AutoFlow and a higher midazolam dose.
CONCLUSIONS: This first long-term clinical evaluation of the AutoFlow mode demonstrated its safety with regard to gas exchange and patient outcome. AutoFlow also allowed a very marked reduction in the number of ventilator alarms.

個人防護裝備用於大流行流感病人的護理：空氣淨化呼吸器應用培訓

Special Article: Personal Protective Equipment for Care of Pandemic Influenza Patients: A Training Workshop for the Powered Air Purifying Respirator

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呼吸道病毒傳染性疾病對於專業醫護人員可以有生命威脅，可發生在他們進行產生氣溶膠的操作時，其中包括氣管插管。2009 年的甲型 HINI 流感大流行把這個關注提到了當時的最前線。疾病控制與預防中心已表示，在呼吸道病毒傳染性疾病患者身上進行或者參加產生氣溶膠操作時，專業醫護人員最低必須佩戴 N95 防護口罩，同時他們也推薦考慮使用空氣動力淨化呼吸器（PAPR）。對於流感或者其他通過呼吸道及接觸傳播的疾病，防護性口罩必須屬於接觸性預防的一部分。

在職業安全與衛生管理局遵循的呼吸道防護計畫中，使用 PAPR 能夠提供大於 N95 2.5 到 100 倍的保護。使用指定的保護係數來量化口罩的相對防護能力。防護的水準要達到指定的 APF 只能在進行適當的訓練和正確使用口罩的前提下。

端面密封洩漏限制了 N95 防護口罩的防護能力，擬合試驗並不能保證端面密封的不洩漏。不適當使用被污染的設備、錯誤的裝配和持續使用，不正確的開啓和關閉程式都可能使 PAPR 的防護能力失效。壓迫，不適和對於身體的累贅可能損害其性能。通過培訓能夠減輕這些影響。

強烈建議在需要使用 PAPR 之前進行培訓。在大流行流感期間，“臨時”的培訓不可能爲需要特殊專業保護裝備的從業群體提供充分的準備。醫院職工保健部門目前也許沒有一個適當的 PAPR 培訓計畫。麻醉科和重症監護室將被考慮帶頭與醫院職工保健部門合作來建立一個 PAPR 培訓計畫。

用戶指南說明 PAPR 不能在手術中使用，因爲它會產生確定的外向氣流，增加傷口的感染。當前欠缺澄清這一禁令和適當的解決並需要解決。手術室通風系統不是一個可以接受的選擇。

作者提供了一個線上的 PAPR 學習班。在這裏發表支援資訊。麻醉和重症監護室可以利用這個平臺，但不能替代製造商的詳細使用和維修說明。

（張蕾　譯　陳傑　校）

Virulent respiratory infectious diseases may present a life-threatening risk for health care professionals during aerosol-generating procedures, including endotracheal intubation. The 2009 Pandemic Influenza A (H1N1) brings this concern to the immediate forefront. The Centers for Disease Control and Prevention have stated that, when performing or participating in aerosol-generating procedures on patients with virulent contagious respiratory diseases, health care professionals must wear a minimum of the N95 respirator, and they may wish to consider using the powered air purifying respirator (PAPR). For influenza and other diseases transmitted by both respiratory and contact modes, protective respirators must be combined with contact precautions.

The PAPR provides 2.5 to 100 times greater protection than the N95, when used within the context of an Occupational Safety and Health Administration–compliant respiratory protection program. The relative protective capability of a respirator is quantified using the assigned protection factor. The level of protection designated by the APF can only be achieved with appropriate training and correct use of the respirator.

Face seal leakage limits the protective capability of the N95 respirator, and fit testing does not assure the ability to maintain a tight face seal. The protective capability of the PAPR will be defeated by improper handling of contaminated equipment, incorrect assembly and maintenance, and improper don (put on) and doff (take off) procedures. Stress, discomfort, and physical encumbrance may impair performance. Acclimatization through training will mitigate these effects.

Training in the use of PAPRs in advance of their need is strongly advised. “Just in time” training is unlikely to provide adequate preparation for groups of practitioners requiring specialized personal protective equipment during a pandemic. Employee health departments in hospitals may not presently have a PAPR training program in place. Anesthesia and critical care providers would be well advised to take the lead in working with their hospitals' employee health departments to establish a PAPR training program where none exists.
User instructions state that the PAPR should not be used during surgery because it generates positive outward airflow, and may increase the risk of wound infection. Clarification of this prohibition and acceptable solutions are currently lacking and need to be addressed. The surgical hood system is not an acceptable alternative.
We provide on line a PAPR training workshop. Supporting information is presented here. Anesthesia and critical care providers may use this workshop to supplement, but not substitute for, the manufacturers' detailed use and maintenance instructions.

肺複張和呼氣末正壓在健康肺和病肺有不同的 CO2 清除作用

Lung Recruitment and Positive End-Expiratory Pressure Have Different Effects on CO2 Elimination in Healthy and Sick Lungs

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背景：作者研究了肺複張手法和 PEEP 對每次呼吸的 CO2 清除量的影響 (Vtco2,br)。
方法：分別對 7 例健康和 7 例肺灌洗豬肺施以恒定潮氣量通氣，每隔 10 分鐘，以 6 cm H2O 爲間隔，其 PEEP 從 0 增加至 18 cm H2O 後再降至 0。在 18 cm H2O PEEP 間隔間對健康肺和灌洗肺分別予以 2 分鐘的週期性肺複張，其平臺壓/PEEP 分別對應爲 40/20cm H2O 、50/25cm H2O . 需要記錄的資料包括容積二氧化碳圖、呼吸力學、血氣分析以及血液動力學資料。
結果：在未行肺複張的健康肺， Vtco2,br 與 PEEP 成相反比例：在 0-PEEP 水準，Vtco2,br 爲 4.0ml (3.6–4.4) mL（對應爲中位數，四分位數間距），在 18-PEEP 水準，則降爲 3.1 (2.8–3.4) mL ($P < 0.05$). 在肺複張後， Vtco2,br 增加至 18-PEEP 的 3.3 (3–3.6) mL 以及 0-PEEP 的 4.0 (3.5–4.5) mL($P < 0.05$). 灌洗肺行肺複張前，Vtco2,br 最初從 0-PEEP 水準的 2.0 (1.7–2.3) mL 增加至 12-PEEP 水準的 2.6 (2.2–3) mL ($P < 0.05$) ，但當 PEEP 增加至 18 cm H2O 時，其 Vtco2,br 降爲 2.4 (2–2.8) mL ($P < 0.05$). 肺複張後，最高的 Vtco2,br 出現在 12-PEEP，其值爲 2.9 (2.1–3.7) mL，而在 0-PEEP 則減至 2.5 (1.9–3.1) mL ($P < 0.05$). Vtco2,br 與肺灌注、氣體交換面積、肺泡通氣量的變化正相關，與死腔量負相關。

結論：肺的 CO2 清除作用依賴於 PEEP 以及肺複張，且這種作用在健康肺與病肺有很大區別。
（鄒巧群　譯　陳傑　校）
BACKGROUND: We studied the effects that the lung recruitment maneuver (RM) and positive end-expiratory pressure (PEEP) have on the elimination of CO2 per breath (Vtco2,br).
METHODS: In 7 healthy and 7 lung-lavaged pigs at constant ventilation, PEEP was increased from 0 to 18 cm H2O and then decreased to 0 in steps of 6 cm H2O every 10 minutes. Cycling RMs with plateau pressure/PEEP of 40/20 (healthy) and 50/25 (lavaged) cm H2O were applied for 2 minutes between 18-PEEP steps. Volumetric capnography, respiratory mechanics, blood gas, and hemodynamic data were recorded.
RESULTS: In healthy lungs before the RM, Vtco2,br was inversely proportional to PEEP decreasing from 4.0 (3.6–4.4) mL (median and interquartile range) at 0-PEEP to 3.1 (2.8–3.4) mL at 18-PEEP ($P < 0.05$). After the RM, Vtco2,br increased from 3.3 (3–3.6) mL at 18-PEEP to 4.0 (3.5–4.5) mL at 0-PEEP ($P < 0.05$). In lavaged lungs before the RM, Vtco2,br increased initially from 2.0 (1.7–2.3) mL at 0-PEEP to 2.6 (2.2–3) mL at 12-PEEP ($P < 0.05$) but then decreased to 2.4 (2–2.8) mL when PEEP was increased further to 18 cm H2O ($P < 0.05$). After the RM, the highest Vtco2,br of 2.9 (2.1–3.7) mL was observed at 12-PEEP and then decreased to 2.5 (1.9–3.1) mL at 0-PEEP ($P < 0.05$). Vtco2,br was directly related to changes in lung perfusion, the area of gas exchange, and alveolar ventilation but inversely related to changes in dead space.
CONCLUSIONS: CO2 elimination by the lungs was dependent on PEEP and recruitment and showed major differences between healthy and lavaged lungs.

同側腹橫肌平面阻滯可爲小兒闌尾術後提供有效的鎮痛：一項隨機對照實驗

Ipsilateral Transversus Abdominis Plane Block Provides Effective Analgesia After Appendectomy in Children: A Randomized Controlled Trial

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背景：腹橫肌平面阻滯（TAP）在成人的腹部外科手術中能提供有效的鎮痛效果，它的效果在小兒中還不清楚，並且在這些人群中還沒有隨機的臨床試驗。在這項隨機，對照，雙盲的臨床研究中，作者評估 TAP 對闌尾手術的腹部切口在第一個術後 48 小時的鎮痛效果。
方法：40 例闌尾切除術的小兒隨機分爲羅呱卡因組(n = 19) 和安慰劑組 (n = 21)，單側行 TAP 阻滯。除此之外，標準的術後鎮痛包括靜脈嗎啡和定時使用雙氯芬酸及對乙醯氨基酚。所有患者均接受標準的全身麻醉，在麻醉誘導後，使用 0.75%的羅呱卡因或是等量的鹽水在切口同側通過體表解剖定位法來行 TAP 阻滯。

結果：在術後第一個 48 小時內用羅呱卡因 TAP 組比安慰劑組嗎啡的需要量降低 (10.3 ± 12.7 vs 22.3 ± 14.7 mg; $P < 0.01$) 。與安慰劑相比，TAP 組也可以降低睡眠時和休息時的視覺類比疼痛評分。在這兩組中鎮靜或是噁心嘔吐的發生率無顯著差異，TAP 組無相關併發症。
結論：單側腹橫肌平面阻滯，作爲多元鎮痛方法的一種，與安慰劑相比，在小兒闌尾手術的術後第一個 48h 期間能提供良好的鎮痛。
（張磊　譯　陳傑　校）

BACKGROUND: The transversus abdominis plane (TAP) block provides effective postoperative analgesia in adults undergoing major abdominal surgery. Its efficacy in children remains unclear, with no randomized clinical trials in this population. In this study, we evaluated its analgesic efficacy over the first 48 postoperative hours after appendectomy performed through an open abdominal incision, in a randomized, controlled, double-blind clinical trial.
METHODS: Forty children undergoing appendectomy were randomized to undergo unilateral TAP block with ropivacaine ($n = 19$) versus placebo ($n = 21$) in addition to standard postoperative analgesia comprising IV morphine analgesia and regular diclofenac and acetaminophen. All patients received a standard general anesthetic, and after induction of anesthesia, a TAP block was performed using the landmark technique with 2.5 mg · kg−1 ropivacaine 0.75% or an equal volume (0.3 mL · kg−1) of saline on the ipsilateral side to the incision.
RESULTS: The TAP block with ropivacaine reduced mean (±SD) morphine requirements in the first 48 postoperative hours (10.3 ± 12.7 vs 22.3 ± 14.7 mg; $P < 0.01$) compared with placebo block. The TAP block also reduced postoperative visual analog scale pain scores at rest and on movement compared with placebo. Interval morphine consumption was reduced over the first 24 postoperative hours. There were no between-group differences in the incidence of sedation or nausea and vomiting. There were no complications attributable to the TAP block.
CONCLUSIONS: Unilateral TAP block, as a component of a multimodal analgesic regimen, provided superior analgesia compared with placebo in the first 48 postoperative hours after appendectomy in children.

小兒氣管支氣管異物麻醉的思考： 12979 例的文獻回顧

Review Article: The Anesthetic Considerations of Tracheobronchial Foreign Bodies in Children: A Literature Review of 12,979 Cases

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吸入異物造成的窒息是小於 4 歲兒童意外事故死亡的一個主要原因。作者分析了有關吸入異物的最新流行病學，並回顧了其診斷和處理的當前趨勢。在這篇文章中，作者討論了支氣管鏡取出異物的麻醉管理。本綜述包括 12979 例兒科支氣管鏡的文

獻。大多數吸入異物是有機材料（81％可信區間[CI] = 77％-86％），以堅果和種子最常見。多數異物（88％CI 爲 85％-91％）在支氣管，其餘在喉部或氣管。右側支氣管異物的發生率（52％，CI 爲 48％-55％）比左側（33％CI 爲 30％-37％）高。小部分的異物分裂爲碎片並出現在呼吸道的不同部位。只有 11％（CI 爲 80％-16％）的異物能通過 X 線顯影， 17％（CI 爲 13％-22％）的兒童胸片檢查顯示爲正常。儘管硬支氣管鏡是傳統診斷的“金標準”，但 CT，虛擬支氣管鏡，軟支氣管鏡的應用正在增加。據報導支氣管鏡檢查的死亡率爲 0.42％。儘管當場窒息或緊急支氣管鏡檢查可引起一部分患者死亡，但院內死亡的大部分原因爲取異物時的低氧性心搏驟停，支氣管痛，以及當時病情平穩但出現未料的術中併發症。主要併發症包括需行氣管切開或氣管插管的嚴重喉水腫、支氣管痙攣，氣胸，縱膈氣腫，心跳驟停，氣管支氣管撕裂傷，低氧性腦損傷(0.96%)。胃內容物的誤吸未見報導。術前評估必須確認異物所在的位置，異物的性質和異物吸入的時間（性質，位置，時間）。是否行吸入或者靜脈誘導，保留自主呼吸或控制通氣，以吸入或靜脈維持應根據病人情況行個體化選擇。雖然多數麻醉技術對吸入異物的麻醉管理都有效，但是文獻中沒有提及最佳選擇。爲儘量減少部分梗阻轉換爲完全梗阻的危險性，常用保留自主通氣的誘導方式。控制通氣結合靜脈麻醉藥，肌松爲硬支氣管鏡檢查和平穩麻醉創造良好的條件。麻醉醫生與支氣管鏡檢查者及助手的密切溝通是必不可少的。

（舒慧剛　譯　陳傑　校）

Asphyxiation by an inhaled foreign body is a leading cause of accidental death among children younger than 4 years. We analyzed the recent epidemiology of foreign body aspiration and reviewed the current trends in diagnosis and management. In this article, we discuss anesthetic management of bronchoscopy to remove objects. The reviewed articles total 12,979 pediatric bronchoscopies. Most aspirated foreign bodies are organic materials (81%, confidence interval [CI] = 77%–86%), nuts and seeds being the most common. The majority of foreign bodies (88%, CI = 85%–91%) lodge in the bronchial tree, with the remainder catching in the larynx or trachea. The incidence of right-sided foreign bodies (52%, CI = 48%–55%) is higher than that of left-sided foreign bodies (33%, CI = 30%–37%). A small number of objects fragment and lodge in different parts of the airways. Only 11% (CI = 8%–16%) of the foreign bodies were radio-opaque on radiograph, with chest radiographs being normal in 17% of children (CI = 13%–22%). Although rigid bronchoscopy is the traditional diagnostic “gold standard,” the use of computerized tomography, virtual bronchoscopy, and flexible bronchoscopy is increasing. Reported mortality during bronchoscopy is 0.42%. Although asphyxia at presentation or initial emergency bronchoscopy causes some deaths, hypoxic cardiac arrest during retrieval of the object, bronchial rupture, and unspecified intraoperative complications in previously stable patients constitute the majority of in-hospital fatalities. Major complications include severe laryngeal edema or bronchospasm requiring tracheotomy or reintubation, pneumothorax, pneumomediastinum, cardiac arrest, tracheal or bronchial laceration, and hypoxic brain damage (0.96%). Aspiration of gastric contents is not reported. Preoperative assessment should determine where the aspirated foreign body has lodged, what was aspirated, and when the aspiration occurred (“what, where, when”). The choices of inhaled or IV induction, spontaneous or controlled ventilation, and inhaled or IV maintenance may be individualized to the circumstances. Although several

anesthetic techniques are effective for managing children with foreign body aspiration, there is no consensus from the literature as to which technique is optimal. An induction that maintains spontaneous ventilation is commonly practiced to minimize the risk of converting a partial proximal obstruction to a complete obstruction. Controlled ventilation combined with IV drugs and paralysis allows for suitable rigid bronchoscopy conditions and a consistent level of anesthesia. Close communication between the anesthesiologist, bronchoscopist, and assistants is essential.

氯胺酮麻醉對術後有敗血病小鼠免疫功能的影響

The Effect of Ketamine Anesthesia on the Immune Function of Mice with Postoperative Septicemia

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背景：目前尚未闡明氯胺酮對免疫方面作用如何影響術後敗血症患者的預後。作者通過調查氯胺酮麻醉對剖腹手術小鼠術後用脂多糖或埃希氏大腸桿菌激發敗血症，觀察肝巨噬細胞和細胞因數的產生。
方法：C57BL/6 小鼠接受氯胺酮或者七氟醚麻醉下行剖腹手術，小鼠用埃希大腸菌屬或者是脂多糖激發敗血症，隨後檢查小鼠的生存率和細胞因數的分泌，評估 β 受體阻滯劑納多洛爾對氯胺酮麻醉的效應，用來闡明氯胺酮引起的免疫抑制效應的機制。
結果：與七氟醚麻醉相比，氯胺酮麻醉提高了剖腹手術後脂多糖激發敗血症小鼠的生存率，但是在埃希大腸菌屬激發組，氯胺酮沒有發現有上述作用。在脂多糖和埃希大腸菌屬注射後，氯胺酮抑制 TNF 和 IFN-r 分泌物，當用抗生素抑制細菌的生長，與七氟醚麻醉相比，氯胺酮麻醉可以有效提高注射埃希大腸菌屬小鼠的生存率。在使用抗生素的七氟醚麻醉組，中和 TNF 可以提高生存率和減少 IFN-r 分泌，表明氯胺酮對 TNF 的抑制可以提高生存率。在脂多糖激發組氯胺酮可以抑制活體肝巨噬細胞對微球體內的吞噬作用。在脂多糖激發組，使用麻醉劑量的氯胺酮聯合使用納多洛爾不會恢復 TNF 的抑制，這表明和 β-腎上腺素能通路無關。然而，它恢復在低劑量氯胺酮（10%的麻醉劑量）TNF 的分泌。與此相反，麻醉劑量的氯胺酮通過 β-腎上腺素能通路，納多洛爾恢復了肝巨噬細胞的吞噬功能。
結論：氯胺酮抑制 TNF 的產生和枯否細胞/巨噬細胞的吞噬功能。因此 除非細菌的生長被很好的控制（用抗生素），儘管減少了炎症反應但是術後感染不會很好的控制。
（劉世文　譯　陳傑　校）

BACKGROUND: It is unknown how ketamine anesthesia immunologically affects the outcome of patients with postoperative septicemia. We investigated the effects of ketamine anesthesia on mice with an *Escherichia coli* or lipopolysaccharide (LPS) challenge after laparotomy, focusing on phagocytosis by liver macrophages (Kupffer cells) and cytokine production.
METHODS: C57BL/6 mice received ketamine or sevoflurane anesthesia during laparotomy, which was followed by an *E. coli* or LPS challenge; thereafter, mouse survival rates and cytokine secretions were examined. The effects of a β-adrenoceptor antagonist, nadolol, on ketamine anesthesia were also assessed to clarify the mechanisms of ketamine-induced immunosuppressive effects.
RESULTS: Ketamine anesthesia increased the mouse survival rate after LPS challenge after laparotomy compared with sevoflurane anesthesia, whereas such an effect of ketamine was not observed after *E. coli* challenge. Ketamine suppressed tumor necrosis factor (TNF) and interferon (IFN)-γ secretion after LPS and *E. coli* challenge. When bacterial growth was inhibited using an antibiotic, ketamine anesthesia effectively improved mouse survival after *E. coli* challenge compared with sevoflurane anesthesia. Neutralization of TNF also improved survival and decreased IFN-γ secretion after bacterial challenge in antibiotic-treated mice with sevoflurane anesthesia, suggesting that ketamine's suppression of TNF may improve survival. Ketamine also suppressed in vivo phagocytosis of microspheres by Kupffer cells in LPS-challenged mice. Concomitant use of nadolol with an anesthetic dose of ketamine did not restore TNF suppression in LPS-challenged mice, suggesting a mechanism independent of the β-adrenergic pathway. However, it restored TNF secretion under low-dose ketamine (10% anesthetic dose). In contrast, nadolol restored the decrease in phagocytosis by Kupffer cells, which was induced by the anesthetic dose of ketamine via the β-adrenergic pathway, suggesting distinct mechanisms.
CONCLUSION: Ketamine suppresses TNF production and phagocytosis by Kupffer cells/macrophages. Therefore, unless bacterial growth is well controlled (by an antibiotic), postoperative infection might not improve despite reduction of the inflammatory response.

Cochrane Corner：鎖骨下臂叢神經阻滯用於下臂手術的局部麻醉

Cochrane Corner: Infraclavicular Brachial Plexus Block for Regional Anaesthesia of the Lower Arm

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背景：臂叢神經阻滯有多種不同的路入。儘管鎖骨下法臂叢神經阻滯（簡稱 ICB）有幾個優勢技術，但目前尚不清楚下臂手術臂叢麻醉哪一徑路爲首選。因此，研究者對 ICB 和其他臂叢神經阻滯（BPBs）做了系統回顧評價。
目的：評價 ICB 和其他 BPBs 在下臂區域麻醉中的療效和安全性。
搜索策略：研究者檢索了 CENTRAL（Cochrane 圖書館 2008 年，第 3 期），MEDLINE（1950 年至 2008 年 9 月 22 日）和 EMBASE（1980 年至 2008 年 9 月 22 日）。研究者還檢索會議論文集（2004 年至 2008 年）和 www.clinicaltrials.gov 的資料。檢索過程中沒有對論文語言進行限制。

遴選準則：研究者選取了以 ICB 或其他 BPBs 作爲下臂外科手術唯一的麻醉方式並兩者做對比的隨機對照試驗（RCTs）。
資料獲取與分析：主要結果是麻醉後 30min 內能阻滯完全並能夠行手術的情況。次要結果包括阻滯不全，止血帶疼痛，感覺阻滯起效時程，阻滯持續時間，阻滯伴隨疼痛及阻滯引起的相關併發症。
主要結果：研究者確定了 15 項研究共計 1020 名受試者，其中 510 例接受 ICB，510 例接受其他 BPBs。對照組是 10 項腋路阻滯的研究，兩項肱正中阻滯的研究，兩項鎖骨上阻滯的研究，一項肌間溝阻滯的研究。三項研究採用超聲引導下 ICB 技術，麻醉失敗和出現併發症的風險遠低於同類 ICB 和所有其他 BPBs。ICB 後止血帶疼痛可能少一些（風險比（RR）0.47，95％CI 爲 0.24～0.92，P 值 0.03）。與單次腋路阻滯相比，ICB 在肌皮神經感覺阻滯（失敗率 0.46，95％CI 爲 0.27 至 0.60，P 值 0.0001）與腋神經阻滯（失敗率 0.37，95％CI 爲 0.24 至 0.58，P 值 0.0001）上更完全。與腋路多點阻滯（平均差（MD）爲-2.7 分，95％CI 爲-4.2 到-1.1，P 值 0.0006）和肱正中阻滯相比（平均差爲-4.8 分，95％CI 爲-6.0 至-3.6 ，P 值 0.00001），ICB 起效更迅速，但 ICB 有更長的感覺阻滯起效時間（MD3.9min，95％CI 爲 3.2 至 4.5，P 值 0.00001）。
作者的結論：與其他 BPBs 的阻滯療效相比較，ICB 是下臂手術的一種安全、簡便的麻醉方式。ICB 的優點包括手術中止血帶疼痛的可能性降低，相比單點腋路神經阻滯具有更可靠的肌皮神經和腋神經阻滯。在允許注射量大於 40ml、足夠的阻滯時間（至少 30min）的條件下，ICB 的療效可能會改善。由於許多出版文章包括在本次檢索內容中的隨機對照研究已經證實，遠端運動後束反應是電刺激引導下 ICB 的端點，作者推薦在今後比較研究中可以利用這一點。尚需另外隨機對照試驗來對比超聲引導下 ICB 與其他 BPBs 的區別。
（丁俊雲　譯　陳傑　校）

BACKGROUND: Several approaches exist to produce local anaesthetic blockade of the brachial plexus. It is not clear which is the technique of choice for providing surgical anaesthesia of the lower arm although infraclavicular blockade (ICB) has several purported advantages. We therefore performed a systematic review of ICB compared to the other brachial plexus blocks (BPBs).
OBJECTIVES: To evaluate the efficacy and safety of ICB compared to other BPBs in providing regional anaesthesia of the lower arm.
SEARCH STRATEGY: We searched CENTRAL (*The Cochrane Library* 2008, Issue 3), MEDLINE (1950 to September 22nd 2008) and EMBASE (1980 to September 22nd 2008). We also searched conference proceedings (from 2004 to 2008) and the www.clinicaltrials.gov registry. No language restriction was applied.
SELECTION CRITERIA: We included any randomized controlled trials (RCTs) that compared ICB with other BPBs as the sole anaesthetic techniques for surgery on the lower arm.
DATA COLLECTION AND ANALYSIS: The primary outcome was adequate surgical anaesthesia within 30 minutes of block completion. Secondary outcomes included sensory block of individual nerves, tourniquet pain, onset time of sensory blockade, block performance time, block-associated pain and complications related to the block.

MAIN RESULTS: We identified 15 studies with 1020 participants, of whom 510 received ICB and 510 received other BPBs. The control group intervention was the axillary block in 10 studies, mid-humeral block in two studies, supraclavicular block in two studies and parascalene block in one study. Three studies employed ultrasound-guided ICB. The risk of failed surgical anaesthesia and of complications were low and similar for ICB and all other BPBs. Tourniquet pain was less likely with ICB (risk ratio (RR) 0.47, 95% CI 0.24 to 0.92, P = 0.03). When compared to a single-injection axillary block, ICB was better at providing complete sensory block of the musculocutaneous nerve (RR for failure 0.46, 95% CI 0.27 to 0.60, P < 0.0001) and the axillary nerve (RR of failure 0.37, 95% CI 0.24 to 0.58, P < 0.0001). ICB was faster to perform than multiple-injection axillary (mean difference (MD) −2.7 min, 95% CI −4.2 to −1.1, P = 0.0006) or midhumeral blocks (MD −4.8 min, 95% CI −6.0 to −3.6, P < 0.00001) but this was offset by a longer sensory block onset time (MD 3.9 min, 95% CI 3.2 to 4.5, P < 0.00001).
AUTHORS' CONCLUSIONS: ICB is a safe and simple technique for providing surgical anaesthesia of the lower arm, with an efficacy comparable to other BPBs. The advantages of ICB include a lower likelihood of tourniquet pain during surgery, and more reliable blockade of the musculocutaneous and axillary nerves when compared to a single-injection axillary block. The efficacy of ICB is likely to be improved if adequate time is allowed for block onset (at least 30 minutes) and if a volume of at least 40 ml is injected. Since publication of many of the trials included in this review, it has become clear that a distal posterior cord motor response is the appropriate endpoint for electrostimulation-guided ICB; we recommend it be used in all future comparative studies. There is also a need for additional RCTs comparing ultrasound-guided ICB with other BPBs.

心臟手術抗凝所需的肝素濃度不能可靠預測肝素的注射劑量

Heparin Concentration-Based Anticoagulation for Cardiac Surgery Fails to Reliably Predict Heparin Bolus Dose Requirements.

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背景：先進的床旁診斷檢驗資訊系統現已逐步成爲止血管理的新技術，其通過對抗凝所需肝素濃度的計算爲患者提供個性化的肝素注射方案。Hepcon 止血管理系統（美敦力公司，明尼阿波利斯，明尼蘇達州）可對肝素劑量、活化凝血時間（ACT）及肝素劑量回應（HDR）進行評估。然而在大樣本人群中，此類測試的系統性評價並未開展與實施。
方法：此次研究共調查了 2005 年 2 月至 2008 年 7 月間所有於我院行體外迴圈術下心臟手術患者的資料資料。在此期間，Hepcon 止血管理系統專用於肝素劑量與凝血監測的評估。研究所需記錄的資料資訊包括詳盡的人口統計學資料、手術情況、

實驗室檢查及肝素的單次注射劑量等。此外，ACT、計算所得與實際測定的 HDR 及肝素濃度等也需記錄在案。通過比較實際與目標 ACT 及計算所得與實際測定 HDR 間的關係，對 Hepcon 止血管理系統的臨床運用作一評價。
結果：在 3880 名實施心臟手術的患者中，針對目標 ACT 給予的肝素注射劑量導致肝素化後患者的 ACT 呈現出巨大差異（r(2) = 0.03）。其中，有 7.4%的患者其肝素化後的 ACT 值未達到 300 秒的目標 ACT；而未達到 350 秒目標 ACT 的患者更占 16.9%。同樣，經統計後發現，根據 HDR 所計算得到的目標肝素濃度與注射後的實際肝素濃度間並無關聯，甚至有 18.5%的病例在測定中出現了相差超過 2 倍的情況。而計算所得與實際測定的 HDR 在任一肝素濃度均無線性相關性。
結論：在體外迴圈前，Hepcon 止血管理系統不能充分評估肝素的注射劑量。進一步的前瞻性研究需闡明構建體外迴圈所需抗凝的具體因素及在手術室內臨床醫生該如何切實可靠地評價抗凝效應。
（范羽譯 薛張綱校）
BACKGROUND: Hemostasis management has evolved to include sophisticated point-of-care systems that provide individualized dosing through heparin concentration-based anticoagulation. The Hepcon HMS Plus system (Medtronic, Minneapolis, MN) estimates heparin dose, activated clotting time (ACT), and heparin dose response (HDR). However, the accuracy of this test has not been systematically evaluated in large cohorts.
METHODS: We examined institutional databases for all patients who underwent cardiac surgery with cardiopulmonary bypass (CPB) at our institution from February 2005 to July 2008. During this period, the Hepcon HMS Plus was used exclusively for assessment of heparin dosing and coagulation monitoring. Detailed demographic, surgical, laboratory, and heparin dosing data were recorded. ACT, calculated and measured HDR, and heparin concentrations were recorded. Performance of the Hepcon HMS Plus was assessed by comparison of actual and target ACT values and calculated and measured HDR.
RESULTS: In 3880 patients undergoing cardiac surgery, heparin bolus dosing to a target ACT resulted in wide variation in the postheparin ACT (r(2) = 0.03). The postheparin ACT did not reach the target ACT threshold in 7.4% (i.e., when target ACT was 300 s) and 16.9% (i.e., when target ACT was 350 s) of patients. Similarly, the target heparin level calculated from the HDR did not correlate with the postbolus heparin level, with 18.5% of samples differing by more than 2 levels of the assay. Calculated and measured HDR were not linearly related at any heparin level.
CONCLUSIONS: The Hepcon HMS Plus system poorly estimates heparin bolus requirements in the pre-CPB period. Further prospective studies are needed to elucidate what constitutes adequate anticoagulation for CPB and how clinicians can reliably and practically assess anticoagulation in the operating room.

β2受體偶聯的磷酸肌醇3激酶通過磷酸二酯酶4的啓動表現出cAMP依賴式的心肌收縮力增強

β2-adrenergic receptor-coupled phosphoinositide 3-kinase constrains cAMP-dependent increases in cardiac inotropy through phosphodiesterase 4 activation.
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Anesth Analg. 2010 Oct;111(4):870-7.

背景：眾多的證據表明磷酸肌醇-3-激酶(PI3K)可以調節心肌收縮力，然而其機制尚不明了。我們認爲，β2腎上腺能受體偶聯PI3K可以通過啓動cAMP依賴的磷酸二酯酶從而增強心肌收縮力。
方法：我們測試了在離體的鼠心肌細胞中PI3K和PDE4抑制劑對心肌收縮力的影響，從而瞭解其生理功能(肌纖維節縮短和鈣離子向細胞內流動)以及cAMP和PDE活性。
結果：PI3K抑制劑輔以可逆的LY294002抑制劑可以使得肌纖維節明顯縮短並且提高對鈣離子的處理能力，從而增加心肌細胞的收縮力。這一反應依賴於G蛋白的啓動。因爲百日咳毒素具有不可逆的G蛋白抑制作用,而當與百日咳毒素共同培養時，LY介導的收縮力增強反應便會消失。此外，PI3K抑制劑對於肌纖維節的收縮作用弱於PDE3,4抑制劑(米力農)聯合LY。並且，LY可以劑量依賴性地削弱PDE4的活性(當LY濃度達到10uM時，只有58%的PDE4具有活性)。特別需要指出，當PI3K(γ)與PDE4D會發生免疫反應產生沉澱。所誘導出的心肌細胞收縮力加強這一反應可以被β 2受體逆向激動劑所抵制。
結論：PI3K通過cAMP依賴的機制規律地啓動PDE4從而調節心肌細胞收縮力。並且，底物水準上β2受體依賴於激動劑的啓動並由此引起cAMP的擴增以及通過PI3K催化增強PDE4的活性，這些呈現了一個完整的細胞信號轉導機制。這一機制控制cAMP的量化從而控制心肌細胞的收縮力。這一結果可以幫助解釋米力農爲何可以在缺乏直接的β受體激動的情況仍然可以增強心肌收縮力，以及爲何它可以在加入大劑量β受體激動劑後可以顯著增加心肌收縮力。
（黃劍譯 薛張綱校）

BACKGROUND: Emerging evidence suggests that phosphoinositide 3-kinase (PI3K) may modulate cardiac inotropy; however, the underlying mechanism remains elusive. We hypothesized that β(2)-adrenergic receptor (AR)-coupled PI3K constrains increases in cardiac inotropy through cyclic adenosine monophosphate (cAMP)-dependent phosphodiesterase (PDE) activation.
METHODS: We tested the effects of PI3K and PDE4 inhibition on myocardial contractility by using isolated murine cardiac myocytes to study physiologic functions (sarcomere shortening [SS] and intracellular Ca(+) transients), as well as cAMP and PDE activity.
RESULTS: PI3K inhibition with the reversible inhibitor LY294002 (LY) resulted in a significant increase in SS and Ca(2+) handling, indicating enhanced contractility. This response depended on G(iα) protein activity, because incubation with pertussis toxin (an irreversible G(iα) inhibitor) abolished the LY-induced hypercontractility. In addition, PI3K inhibition had no greater effect on SS than both a PDE3,4 inhibitor (milrinone) and LY combined. Furthermore, LY decreased PDE4 activity in a concentration-dependent manner (58.0% of PDE4 activity at LY concentrations of 10 μM). Notably, PI3K(γ) coimmunoprecipitated with PDE4D. The β(2)-AR inverse agonist, ICI 118,551 (ICI), abolished induced increases in contractility.
CONCLUSIONS: PI3K modulates myocardial contractility by a cAMP-dependent mechanism through the regulation of the catalytic activity of PDE4. Furthermore, basal

agonist-independent activity of the β(2)-AR and its resultant cAMP production and enhancement of the catalytic activity of PDE4 through PI3K represents an example of integrative cellular signaling, which controls cAMP dynamics and thereby contractility in the cardiac myocyte. These results help to explain the mechanism by which milrinone is able to increase myocardial contractility in the absence of direct β-adrenergic stimulation and why it can further augment contractility in the presence of maximal β-adrenergic stimulation.

Strepsils® 用於減輕氣管插管後喉部疼痛和聲音嘶啞的研究

Strepsils® Tablets Reduce Sore Throat and Hoarseness After Tracheal Intubation

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Anesth Analg October 2010 111:892-894

背景：Strepsils已成功用於預防和治療口腔炎症，但用於插管後喉部疼痛和聲嘶療效未知。進行此項研究即爲評估Strepsils對氣管插管術後減輕咽喉疼痛和聲嘶的療效。
方法：對150名ASA分級Ⅰ級和Ⅱ級需行擇期整形或婦產科手術的病人給予全身麻醉，受試者被隨機分爲2組。入手術室前，一組給予Strepsils，另一組給相似的安慰劑。然後評估術後即刻和術後24小時咽喉疼痛和聲嘶的發病率和嚴重度。
結果：術後早期咽喉疼痛發病率Strepsils組和對照組分別是13.7%和33.3%；聲嘶的發病率在受試組和對照組分別是12.3%和26.4% (P＜0.05)；術後24小時，在受試組和對照組咽喉疼痛發病率分別降低到6.8% 和18.1%，而聲嘶症狀在受試組和對照組分別降到8.2%和19.4% (P＜0.05)。
結論：圍手術期應用 Strepsils 可以減輕術後咽喉疼痛及聲嘶症狀。
（毛慧譯，薛張剛校）

BACKGROUND: Amyl-m-cresol (Strepsils_) has been successfully used in the prophylaxis andtreatment of oral inflammations, but its effects on postintubation sore throat and hoarseness are
unknown. We conducted this study to evaluate the effects of Strepsils in reducing postintubation sore throat and hoarseness.
METHODS: One hundred fifty patients, ASA physical status I to II, scheduled to undergo general anesthesia and elective orthopedic or gynecologic surgery were enrolled. Participants were randomly allocated to receive either Strepsils or identical-looking placebo tablets immediately before arrival to the operating room. The incidence and severity of postoperative sore throat and hoarseness were evaluated immediately and 24 hours after surgery.
RESULTS: The incidence of early postoperative sore throat was 13.7% and 33.3% and hoarseness was 12.3% and 26.4% in the Strepsils and placebo groups, respectively (P＜0.05).One day after surgery, the incidence of sore throat decreased to 6.8% and 18.1% in the Strepsils and control groups, respectively. The incidence of hoarseness 1 day after the operation decreased to 8.2% in the Strepsils group and 19.4% in the placebo group, but the difference remained statistically significant (P＜0.05).

CONCLUSION: Perioperative use of Strepsils tablets reduces postoperative sore throat and hoarseness of voice. (Anesth Analg 2010;111:892–4)

脈搏血氧飽和度變異指數指導的液體管理減少了乳酸水準並促進了液體管理

Goal-directed fluid management based on the pulse oximeter-derived pleth variability index reduces lactate levels and improves fluid management.

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Anesth Analg. 2010 Oct;111(4):910-4.

背景：一些動態變數預測了液體的反應性，這可能會促進術中液體管理。我們通過顯示脈搏血氧飽和度描記圖的變異性(體積描記圖變異指數，PVI)來研究這是否能指導液體管理，並在乳酸水準上改善了迴圈。
方法：82 名主要進行擇期腹部手術的病人被隨機分爲 2 組，術中 PVI 指導的液體管理組和對照組。全身麻醉誘導後，試驗組輸注晶體液負荷量 500ml 並維持輸注 $2ml \cdot kg^{-1} \cdot h^{-1}$。當 PVI 大於 13%時輸注膠體液 250ml。使用血管活性藥物使動脈壓維持在 65mmHg 以上。對照組先給予晶體液負荷量 500ml，之後以液體衝擊療法爲基礎進行液體管理，並根據其對平均動脈壓和中心靜脈壓的影響進行調整。試驗記錄了圍術期乳酸水準、血流動力學資料和術後併發症發生情況。
結果：在試驗組，術中使用晶體液和總液體量均顯著小於對照組。試驗組在術中和術後 48 小時的乳酸水準也顯著低於對照組($P < 0.05$)。
結論：PVI 爲基礎的目標指導的液體管理減少了術中液體輸注量並降低了術中和術後的乳酸水準。
（任雲譯 薛張綱校））

BACKGROUND: Dynamic variables predict fluid responsiveness and may improve fluid management during surgery. We investigated whether displaying the variability in the pulse oximeter plethysmogram (pleth variability index; PVI) would guide intraoperative fluid management and improve circulation as assessed by lactate levels.
METHODS: Eighty-two patients scheduled for major abdominal surgery were randomized into 2 groups to compare intraoperative PVI-directed fluid management (PVI group) versus standard care (control group). After the induction of general anesthesia, the PVI group received a 500-mL crystalloid bolus and a crystalloid infusion of 2 mL · kg(-1) · h(-1). Colloids of 250 mL were administered if the PVI was >13% Vasoactive drug support was given to maintain the mean arterial blood pressure above 65 mm Hg. In the control group, an infusion of 500 mL of crystalloids was followed by fluid management on the basis of fluid challenges and their effects on mean arterial blood and central venous pressure. Perioperative lactate levels, hemodynamic data, and postoperative complications were recorded prospectively.
RESULTS: Intraoperative crystalloids and total volume infused were significantly lower in the goal-directed PVI group. Lactate levels were significantly lower in the PVI group during surgery and 48 hours after surgery ($P < 0.05$).

CONCLUSIONS: PVI-based goal-directed fluid management reduced the volume of intraoperative fluid infused and reduced intraoperative and postoperative lactate levels.

全憑靜脈麻醉中兩個連續的單向閥能降低靜脈通路中的交叉感染

Two serial check valves can prevent cross-contamination through intravenous tubing during total intravenous anesthesia.

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Anesth Analg October 2010 111:925-928.

背景：在麻醉中帶有細菌的丙泊酚往往與嚴重的膿毒血症和死亡聯繫在一起。在靜脈通路中僅放置一個單向閥並不能防止不斷升高的病原體進入充滿丙泊酚的注射器，所以我們設計了一套靜脈通路帶有多個單向閥。爲了評估這個設計的有效性，我們在靜脈通路的上游檢測病原菌的濃度，這與被污染病人模型中的病原菌濃度有關。

方法：在一個玻璃容器中充滿了細菌或吞噬細胞的混懸液，瓶口用橡膠密封，並保存在 37℃（這是“被污染病人模型”）。一袋正常的生理鹽水連接著一條靜脈通路，從中刺入被橡膠密封的“病人模型”。另外有兩條側流分別與兩個標準的注射泵連接。一個注射器裝有丙泊酚，另外一個裝有標準的生理鹽水以此來代替阿片類藥物。經過 5 個小時的輸注之後，我們在靜脈通路和注射器的各個不同部位採集標本。將標本在血瓊脂平板上面劃片，然後在 37℃的條件下培育 24 個小時。我們用 6 種不同的病原菌來重複這個實驗。

結果：我們培育了 825 塊平板。雖然在任何一塊平板上都沒有發現有細菌生長，但是與對照組相比，在 5 個小時的實驗中，“被污染病人模型”中的細菌或吞噬細胞的濃度均明顯上升。

結論：從這個實驗的資料可以看出，在靜脈通路中設計多個單向閥能夠避免不斷惡化的交叉感染。但是如果你反復使用同一支丙泊酚並不能保證避免感染，因爲這也是生產廠家不推薦的。

（翁梅琳譯 薛張綱校）

BACKGROUND: Nonsterile handling of propofol for anesthesia has been linked with severe sepsis and death. Placing a single check valve in the IV tubing does not prevent retrograde ascension of pathogens into propofol-filled syringes, so we designed an IV tubing set with multiple check valves. To estimate the efficacy of this design, we measured the concentration of pathogens detected upstream in the IV tubing in relation to the pathogen concentration in a model of a contaminated patient.

METHODS: A glass container with a rubber sealed port was filled with a suspension of either bacteria or phagocytes and kept at 37°C ("contaminated patient" model). A bag of normal saline was connected to an IV cannula, punctured through the rubber sealed port of the patient model. Two additional sidestream infusion lines were connected to syringes in 2 standard infusion pumps. One of the syringes contained propofol and the other contained normal saline as a substitute for an opioid preparation. After 5 hours of infusion, we obtained samples from different parts of the infusion lines and syringes. The

samples were streaked out on blood agar plates and incubated at 37℃ for 24 hours. We repeated this experiment with 6 different pathogens.
RESULTS: We incubated 825 agar plates. Whereas the concentration of bacteria and phagocytes in the "patient" had significantly increased during the 5-hour experiments (positive control), no bacterial growth could be detected in any of the incubated plates.
CONCLUSION: The data from this experimental setting suggest that the design with multiple check valves in paired configuration prevents retrograde contamination. Of note, this does not permit the reuse of propofol syringes because reusing is against the manufacturer's recommendations.

標準化流程降低或提高自適應輔助通氣比例不能加快非快速通道心胸手術患者術後的氣管拔管

Adaptive support ventilation with protocolized de-escalation and escalation does not accelerate tracheal extubation of patients after nonfast-track cardiothoracic surgery.
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背景：自適應輔助通氣（adaptive support ventilation，ASV）能否加快非快通道心胸手術患者的脫機尚不清楚。降低呼吸機設定的 ASV 分鐘通氣量的百分比可能會使患者更早從控制通氣轉化爲輔助通氣，可能加快氣管拔管。我們假定，在接受非快通道冠脈搭橋術且術後沒有併發症的患者中，與標準 ASV（設置固定的 ASV 分鐘通氣量百分比）相比，可變 ASV（ASV-DE，即通過標準化流程降低或者提高呼吸機設定的 ASV 分鐘通氣量百分比）可以縮短拔管時間。
方法：我們進行了隨機對照試驗來比較 ASV-DE 和標準 ASV。在 ASV-DE 組，只要機體體溫＞35.0℃且 pH＞7.25，呼吸機設定的 ASV 通氣百分比逐步降低至最低 70%。
結果：63 例患者隨機分入 ASV-DE 組，另外 63 例患者分入標準 ASV 組。兩組的機械通氣時間無統計學差異（ASV-DE 組爲 10.8 [6.5-16.1] 小時， 標準 ASV 組爲 10.7 [6.6-13.9] 小時，P = 0.32）。ASV-DE 組的控制通氣到第一次輔助通氣的時間更短（3.1 [2.0-6.7] vs 3.9 [2.1-7.5] 小時），輔助通氣的次數更多（78 [34-176] vs 57 [32-116]次），但兩者均沒有達到統計學意義。到氣管拔管爲止，兩組的輔助通氣次數有統計學差異（ASV-DE 組爲 2.5 [0.9-4.6]小時，而標準 ASV 組爲 1.4 [0.3-3.5] 小時，P < 0.05）。
結論：在行非快通道的冠脈搭橋術的患者中，與標準 ASV 相比，通過標準化流程降低或提高 ASV 的分鐘通氣量百分比（ASV-DE）不能縮短患者的拔管時間。
（吳少勇譯 薛張綱校）

BACKGROUND: It is uncertain whether adaptive support ventilation (ASV) accelerates weaning of nonfast-track cardiothoracic surgery patients. A lower operator set %-minute ventilation with ASV may allow for an earlier definite switch from controlled to assisted ventilation, potentially hastening tracheal extubation. We hypothesized that ASV using protocolized de-escalation and escalation of operator set %-minute ventilation (ASV-DE) reduces time until tracheal extubation compared with ASV using a fixed operator set %-minute ventilation (standard ASV) in uncomplicated patients after nonfast-track coronary artery bypass graft.
METHODS: We performed a randomized controlled trial comparing ASV-DE with standard ASV. With ASV-DE, as soon as body temperature was >35.0°C with pH >7.25, operator set %-minute ventilation was decreased stepwise to a minimum of 70%.
RESULTS: Sixty-three patients were randomized to ASV-DE, and 63 patients to standard ASV. The duration of mechanical ventilation was not different between groups (10.8 [6.5–16.1] vs 10.7 [6.6–13.9] hours, ASV-DE versus standard ASV; P = 0.32). Time until the first assisted breathing period was shorter (3.1 [2.0–6.7] vs 3.9 [2.1–7.5] hours) and the number of assisted ventilation episodes was higher (78 [34–176] vs 57 [32–116] episodes), but differences did not reach statistical significance. The duration of assisted ventilation episodes that ended with tracheal extubation was different between groups (2.5 [0.9–4.6] vs 1.4 [0.3–3.5] hours, ASV-DE versus standard ASV; P < 0.05).
CONCLUSION: Compared with standard ASV, weaning of patients after nonfast-track coronary artery bypass graft using ASV with protocolized de-escalation and escalation does not shorten time to tracheal extubation.

注入時間對於阿片類藥物分娩陣痛的持續時間的影響

The Influence of Time of Day of Administration on Duration of Opioid Labor Analgesia

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背景: 分娩鎮痛中注入硬膜外腔或蛛網膜下腔的藥物可能會因爲注入的時間而產生不同的效應,而這可能會影響到臨床研究中特殊藥物藥理學的觀察.在這個回顧性研究中, 我們對一天內不同時間在蛛網膜下腔注入芬太尼和全身使用氫嗎啡酮後的效應進行評估,資料來源於觀察鎮痛方法對於分娩結局影響的隨機臨床試驗。
方法:六百九十二名臨產婦在分娩早期提出第一次鎮痛需求時隨機進入腰硬聯合分娩鎮痛（蛛網膜下傾 25ug 芬太尼，隨後注入一個利多卡因混合腎上腺素的硬膜外試驗劑量）或者全身性的分娩鎮痛（氫嗎啡酮 1mg 靜脈注射，1mg 肌肉注射）。除非病人再提出鎮痛需求（第二次鎮痛需求），否則不再給予鎮痛藥物。如果初始鎮痛藥物（區域或是全身）是在 7:01 和 23:00 之間注入的，則受試者進入日間組，如在 23：01 至 7：00 之間注入則進入夜間組。在每一種鎮痛模式中（區域或是全身）對日間組和夜間組進行比較。主要的結局變數是鎮痛持續時間，定義爲首次注入鎮痛藥物至第二次提出鎮痛需求的時間間隔。同時在兩組間比較第一次鎮痛需求

和第二次鎮痛需求時的宮頸擴張程度、第一次鎮痛需求時的疼痛評分、首次注入鎮痛藥物和第二次鎮痛需求間平均疼痛程度。對鎮痛持續時間、宮頸擴張和疼痛評分進行節奏分析。

結果:日間和夜間組中無論是區域性或是全身性鎮痛中位鎮痛時間無顯著性差異。組間未觀察到鎮痛持續時間的調和差異。節奏分析顯示首次鎮痛需求後 24 小時宮頸擴張的諧波週期最大值在 17：00 左右，最小值在 05：00 左右，但是差異的幅度很小。節奏分析中，在區域鎮痛組病人首次注入鎮痛藥物至第二次鎮痛需求間平均疼痛評分的 24 小時諧波分析顯示最大值在 2：00 左右，最小值在 10：00 左右，但是差異幅度很小。

結論: 在這些研究條件下，注入藥物的時間似乎不能影響腰硬聯合或全身性分娩鎮痛的持續時間。

（姚敏敏譯 薛張綱校）

BACKGROUND: Medications administered into the epidural or intrathecal space for labor analgesia may demonstrate variable effects dependent on time of day, and this may affect clinical research trials investigating the pharmacology of specific drugs. In this retrospective study, we evaluated the effect of time of day of administration of intrathecal fentanyl and systemic hydromorphone labor analgesia from data collected as part of a randomized clinical trial examining the influence of analgesia method on labor outcome.

METHODS: Six hundred ninety-two healthy parturients were randomized early in labor to receive combined spinal-epidural (intrathecal fentanyl 25 μg followed by a lidocaine and epinephrine containing epidural test dose) versus systemic (hydromorphone 1 mg IV and 1 mg IM) labor analgesia at first analgesia request. No further analgesics were administered until the patient requested additional analgesia (second analgesia request). Subjects were assigned to the daytime group (DAY) if initial analgesia (neuraxial or systemic) was administered between the hours of 07:01 and 23:00 and to the nighttime group (NIGHT) if it was administered between 23:01 and 07:00. Within each mode of analgesia study arm (neuraxial or systemic), the DAY and NIGHT groups were compared. The primary outcome variable was analgesia duration, defined as the time interval from administration of labor analgesia until the second analgesia request. Cervical dilation at first and second analgesia requests, pain score at first analgesia request, and average amount of pain between analgesia administration and second analgesia request were also compared between DAY and NIGHT groups. Rhythm analyses for duration of analgesia, cervical dilation, and pain scores were performed.

RESULTS: There was no difference in the median duration of either neuraxial or systemic analgesia in DAY versus NIGHT subjects, and no harmonic variation was observed for analgesia duration. Rhythm analysis demonstrated a 24-h harmonic cycle for cervical dilation at first analgesia request with maximum values occurring near 17:00 and minimum values near 05:00, but the amplitude of the difference was very small. Rhythm analysis demonstrated a 24-h harmonic cycle with maximum values occurring near 22:00 and minimum values near 10:00 for the average amount of pain between analgesia administration and second analgesia request in neuraxial group patients, but amplitude was small.

CONCLUSIONS: Time of day of administration did not seem to influence combined spinal-epidural or systemic labor analgesia duration under these study conditions.

美國兒童門診麻醉的流行病學研究：2006 年和 1996 年

Epidemiology of Ambulatory Anesthesia for Children in the United States: 2006 and 1996

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背景：有一些描述在美國接受門診麻醉的兒童的資料，包括頻率、麻醉類型、執行者和地點。 自 20 世紀 80 年代初以來，由於醫療技術的進步和付款模式的變化，門診手術頻率急劇增加。 我們這個研究的主要目的是要計數每年的兒科門診麻醉量和研究十年中兒科麻醉監護使用中的變化。
方法：美國國家衛生統計中心分別於 1994 年和 2006 年進行了全國門診手術調查研究。 這項調查是基於一項外科門診手術中心的全國性的樣本，並通過對所有年齡階段手術和非手術病人進行訪問提供資料。 我們提取其中與接受過門診全麻、局麻或監護的兒童的相關訪問資料。我們從 1996 年和 2006 年的資料庫中獲取資訊，並用人口普查資料來估計美國每年每 1000 名兒童中接受門診麻醉的人數。
結果：在 2006 年，估計有 230 萬門診麻醉護理供給了小於 15 歲的美國兒童（1000 中有 38）。 相比而言， 1996 年同一年齡組的兒童 1000 中僅有 26 名。 在兩段時間中的大多數情況下，麻醉師均參與其中，參與率爲 2006 年 74％和 1996 年 85％。 這些兒童中，14200 人術後住進了醫院，即每 1000 例門診麻醉中有 6 例。
結論：美國兒童接受門診麻醉的數量和頻率在十年中顯著增加。 這項研究提供了一個榜樣，顯示資料庫如何爲健康維護政策制定者和教育者提供有關兒童門診手術中心的使用方面的有用的資訊。
（張玥琪譯，薛張綱校）

BACKGROUND: There are few data that describe the frequency, anesthetic type, provider, or disposition of children requiring outpatient anesthesia in the United States (US). Since the early 1980s, the frequency of ambulatory surgery has increased dramatically because of advances in medical technology and changes in payment arrangements. Our primary aim in this study was to quantify the number of ambulatory anesthetics for children that occur annually and to study the change in utilization of pediatric anesthetic care over a decade.
METHODS: The US National Center for Health Statistics performed the National Survey of Ambulatory Surgery in 1994 through 1996 and again in 2006. The survey is based on data abstracted from a national sample of ambulatory surgery centers and provides data on visits for surgical and nonsurgical procedures for patients of all ages. We abstracted data for children who had general anesthesia, regional anesthesia, or monitored anesthesia care during the ambulatory visit. We obtained the information from the 2006 and 1996 databases and used population census data to estimate the annual utilization of ambulatory anesthesia per 1000 children in the US.
RESULTS: In 2006, an estimated 2.3 million ambulatory anesthesia episodes of care were provided in the US to children younger than 15 years (38 of 1000 children). This

amount compares with 26 per 1000 children of the same age group in 1996. In most cases, an anesthesiologist was involved in both time periods (74% in 2006 and 85% in 1996). Of the children, 14,200 were admitted to the hospital postoperatively, a rate of 6 per 1000 ambulatory anesthesia episodes.
CONCLUSION: The number and rate of ambulatory anesthesia episodes for US children increased dramatically over a decade. This study provides an example of how databases can provide useful information to health care policy makers and educators on the utilization of ambulatory surgical centers by children.

較大擇期手術後延伸急性疼痛服務對臨床預後作用的成本與收益

The Costs and Benefits of Extending the Role of the Acute Pain Service on Clinical Outcomes After Major Elective Surgery

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背景：急性疼痛服務已被廣泛接受，並得到學院和組織的正式支援，但是關於成本與收益的有效證據極少。儘管在對多數較大手術後給予急性疼痛服務方面已達成一致，但是對其他手術的益處還不清楚。需要資料來證明急性疼痛服務任何擴展的合理性。在這項隨機對照臨床試驗中，我們將急性疼痛服務對臨床預後的成本和效應與傳統的病房內疼痛處理進行比較。試驗中的患者都由他們的麻醉醫生爲其決定選擇其中一種適合於手術方式的疼痛處理方法。
方法：423 名實施較大擇期手術的患者隨機分入由一位麻醉醫生領導的以護士爲基礎的患者自控鎮痛急性疼痛服務組，或分入單次肌注或靜注阿片類鎮痛藥的對照組。兩組均用藥物治療阿片類相關副作用，並接受健康專家爲病房設計的常規護理。主要的預後測量指標是恢復評分品質、疼痛強度測量、治療有效性的總體測量以及全部的疼痛處理成本。畫出成本-效應可接受曲線來檢測兩組間成本-效應關係連接點的不同。
結果：處理組與對照組之間術後一天的恢復評分品質無差別（平均差值，0；95%可信區間，−0.7～0.7;P=0.94)，或者恢復評分品質提高率無差別（平均差值，-0.1；95%可信區間，−0.4～0.1;P=0.34)。急性疼痛服務組中獲得一天或數天高效疼痛治療的患者比例較對照組高(86%比 75%;P<0.01)。急性疼痛服務組所耗成本更高（平均差值，46 美元；95%可信區間, 每位患者 44～48 美元;P<0.001)。成本-效應可接受曲線顯示，如果決策者願意爲每個患者每天付多於 546 美元來獲得更有效的治療，急性疼痛服務在提供更有效的疼痛治療時較對照具有更高的成效。
結論：在對接受較大手術的特殊患者群體延伸急性疼痛服務作用過程中，急性疼痛服務可能是有成效的。
（朱蘭芳譯，薛張綱校）

BACKGROUND: Acute pain services have received widespread acceptance and formal support from institutions and organizations, but available evidence on their costs and benefits is scarce. Although there is good agreement on the provision of acute pain services after many major surgical procedures, there are other procedures for which the benefits are unclear. Data are required to justify any expansion of acute pain services. In this randomized, controlled clinical trial we compared the costs and effects of acute pain service care on clinical outcomes with conventional pain management on the ward. Patients included in the trial were considered by their anesthesiologist to have either arm be suitable for the procedure.
METHODS: Four hundred twenty-three patients undergoing major elective surgery were randomized either to an anesthesiologist-led, nurse-based acute pain service group with patient-controlled analgesia or to a control group with IM or IV boluses of opioid analgesia. Both groups were treated with medications to treat opioid-related adverse effects and received the usual care from health professionals assigned to the ward. The main outcome measures were quality of recovery scores, pain intensity measures, global measure of treatment effectiveness, and overall pain treatment cost. Cost-effectiveness acceptability curves were drawn to detect a difference in the joint cost-effect relationship between groups.
RESULTS: There was no difference in quality of recovery score on postoperative day 1 between treatment and control groups (mean difference, 0; 95% confidence interval [CI], −0.7 to 0.7; P = 0.94) or in the rate of improvement in quality of recovery score (mean difference, −0.1; 95% CI, −0.4 to 0.1; P = 0.34). The proportion of patients with 1 or more days of highly effective pain management was higher in the acute pain service group than in the control group (86% vs. 75%; P < 0.01). Costs were higher in the acute pain service group (mean difference, US$46; 95% CI, $44 to $48 per patient; P < 0.001). A cost-effectiveness acceptability curve showed that the acute pain service was more cost effective than was control for providing highly effective pain management if the decision maker was willing to pay more than US$546 per patient per 1 day with highly effective treatment.
CONCLUSION: In extending the role of the acute pain service to a specific group of major surgical procedures, the acute pain service was likely to be cost effective.

通過脈搏氧飽和度測定丙胺卡因區域麻醉導致的高鐵血紅蛋白血症水準

Pulse-Oximetric Measurement of Prilocaine-Induced Methemoglobinemia in Regional Anesthesia

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背景：Masimo Radical 7® 是一種新的測定高鐵血紅蛋白水準的脈搏 CO 飽和度的儀器。但是這種設備在臨床上還沒有進行評估。

方法：在這項前瞻性觀察試驗中，我們比較了丙胺卡因區域麻醉下動脈高鐵血紅蛋白水準及 Radical 7® 測定的脈搏 CO 飽和度水準。
結果：我們分析了 360 對高鐵血紅蛋白水準達到 6.6%的資料。這種儀器的平均偏移及限度(±1.96 SD)爲 0.27% (±1.33%)。
結論：我們發現兩種方法測定的高鐵血紅蛋白水準高度一致。
（陳珺珺譯 薛張綱校）

BACKGROUND: The Masimo Radical 7® is a new pulse CO oximeter designed to measure methemoglobin. The device has not been evaluated in a clinical setting.
METHODS: In this prospective observational study we compared the arterial methemoglobin levels and the corresponding pulse CO-oximetric values of the Radical 7® in regional anesthesia with prilocaine.
RESULTS: We analyzed 360 data pairs with methemoglobin values up to 6.6%. The mean bias and limits (±1.96 SD) of the device were 0.27% (±1.33%).
CONCLUSION: We found a high degree of agreement in measurement of methemoglobin between the 2 methods.